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TMDLS FOR SEGMENTS LISTED FOR MERCURY IN FISH TISSUE FOR THE OUACHITA RIVER BASIN, AND BAYOU BARTHOLOMEW, ARKANSAS AND LOUISIANA TO COLUMBIA

May 30, 2002

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Prepared for

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FINAL
May 30, 2002

EXECUTIVE SUMMARY

The Arkansas and Louisiana 1998 Section 303(d) Lists included 5 segments and 3 subsegment (reaches) in the Ouachita River basin that were impaired due to excess concentrations of mercury in fish. While there have been no known violations of the numeric mercury water quality standard and fishable designated use for these waterbodies, these segments and subsegments are not meeting the narrative water quality standard and designated uses of fishable water bodies. A basin-wide approach is being used in this TMDL due to similar ecoregions and watershed characteristics and because of similar causative factors such as atmospheric and geologic contributions.

The Ouachita River basin is in the Ouachita Mountain, South Central Plain, and Mississippi Alluvial Plain ecoregions. It has gently rolling topography, with hilly uplands, flatwood uplands, terraces, and floodplains. Land use in the basin is 71% forest with 13% in wetlands. There is one NPDES point source with permit mercury limits in the basin. There are seven air emission point sources with permit mercury limits. The geology of the Ouachita Mountains contains rocks with relatively high, naturally occurring mercury concentrations. The soils in the basin reflect this geology and also receive mercury from atmospheric deposition.

Both Arkansas and Louisiana have numeric mercury water quality standards of 0.012 Fg/L. There have been no known violations of the numeric water quality standards, but clean sampling procedures and ultra-trace level analyses have not been used. There are fish consumption advisories in the lower Ouachita River basin and Bayou Bartholomew in both Arkansas and Louisiana because of mercury contamination of fish. The Action Level in Arkansas for fish consumption advisories is 1 mg/kg. While Louisiana does not have an established Action Level, fish tissue mercury concentrations of approximately 0.5 mg/kg have historically triggered fish consumption advisories as a result of risk assessments for individual water bodies. Safe target levels for all fish species in this TMDL are 0.8 mg/kg in Arkansas and 0.4 mg/kg in Louisiana, using a 20% Margin of Safety (MOS) for the Action Levels.

The TMDL was developed using a two-step approach. The first step estimated the mercury loads from the NPDES facility with a permit mercury limit, municipal wastewater treatment facilities, local emission point sources, atmospheric deposition, and watershed nonpoint sources and natural background. In the second step, maximum fish tissue mercury concentrations measured in the Ouachita and Saline River and tributaries were used to estimate the reduction in fish tissue mercury needed to achieve the safe target levels. A linear relationship was assumed between mercury in fish and mercury loading to the basin. This reduction to achieve safe target levels was then used to determine the reduction needed in mercury loading.

The predominant sources of mercury loading to the Ouachita River basin are from atmospheric deposition and watershed nonpoint source and background loads. Less than 1% of the load came from the point source wasteloads. A reduction factor of 2 (i.e., reduction to 50% of current total mercury load) would reduce maximum fish tissue concentrations to fish tissue safe target levels in Arkansas, and a reduction factor of 3 would reduce maximum fish tissue concentrations to fish tissue safe target levels in Louisiana. The TMDL for mercury loading for Arkansas to achieve the target safe levels for fish tissue mercury concentrations is 274,103 g/year. The TMDL for total mercury loading for Louisiana to achieve the target safe levels for fish tissue mercury concentrations is 182,735 g/year. Estimated likely reductions in mercury loading to the Ouachita River basin as a result of implementation of mercury emission regulations and erosion BMPs were calculated. These reductions were not able to achieve the mercury TMDLs based on reduction factors calculated using maximum mercury tissue concentrations in largemouth bass. These reductions did result in basin mercury loads that were less than TMDLs based on reduction factors calculated using average mercury tissue concentrations in largemouth bass. The TMDL for Arkansas based on average mercury tissue concentrations in largemouth bass is 365,470 g/yr. The TMDL for Louisiana based on average mercury tissue concentrations in largemouth bass is 304,559 g/yr. Using the average mercury tissue concentrations to estimate required reductions in mercury loads is less protective than using the maximum mercury tissue concentrations, but is considered adequate to protect human health from effects due to long term exposure. However, it is likely to be decades before this load can be achieved.

This TMDL was developed using the best available information on mercury levels in the environment and waste streams, and current water quality standards. As new information becomes available that would have a bearing on the assumptions on which this TMDL is based, this TMDL may need to be revised in the future.

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1.0 INTRODUCTION

The Arkansas 1998 Section 303(d) List included 5 segments (15 reaches) and the Louisiana 1998 Section 303(d) List included 1 subsegment (reach) impaired due to excess concentrations of mercury in fish within the Ouachita River watershed. Table 1.1 (all tables and figures are located at the end of their respective chapter) identifies segments contained on the 303(d) List due to elevated mercury in fish and where fish consumption advisories have been issued by the state. Figure 1.1 shows the hydrologic unit codes that make up the drainage basin for the listed segments.

This watershed is of critical concern because of litigation over the 303(d) process in both Arkansas and Louisiana and the pervasiveness of mercury contamination. While there have been no known violations of the numeric water quality standard and the fishable designated use for these waterbodies in either state, these segments and subsegments are not meeting the narrative water quality standard and designated uses of fishable water bodies. Therefore, development of a TMDL is required. Because of similar ecoregion and watershed characteristics, and because of potentially similar causative factors such as atmospheric and geologic contributions, a basin-wide approach has been used to develop the TMDL. This TMDL is being conducted under EPA Contract #68-C-99-249, Work Assignment #0-52.

Table 1.1. Ouachita River segments on 303(d) List or where fish consumption advisories have been issued.

Waterbody Name	Segment/Reach	On 303(d) List	Fish Cons. Advisory	Priority
Arkansas				
Ouachita River	08040201-002	Yes	Yes	Low
	08040201-004	Yes	Yes	Low
	08040202-002	Yes	Yes	Low
	08040202-003	Yes	Yes	Low
	08040202-004	Yes	Yes	Low
Saline River	08040203-001	Yes	No	Low
	08040204-001	Yes	Yes	Low
	08040204-002	Yes	Yes	Low
	08040204-004	Yes	Yes	Low
	08040204-006	Yes	Yes	Low
Moro Creek	08040201-001	Yes	Yes	Low
Champagnolle Creek	08040201-003	Yes	Yes	Low
Little Champagnolle	08040202-003	No	Yes	Low
Bayou Bartholomew	08040205-002	Yes	Yes	High
	08040205-012	Yes	Yes	High
Cutoff Creek	08040205-007	Yes	Yes	Low
Louisiana				
Ouachita River - Arkansas State Line to Columbia	Subsegment 080101	Yes	Yes	2
Bayou Bartholomew	Subsegment 080401	No	Yes	-
	Subsegment 080402	No	Yes	-

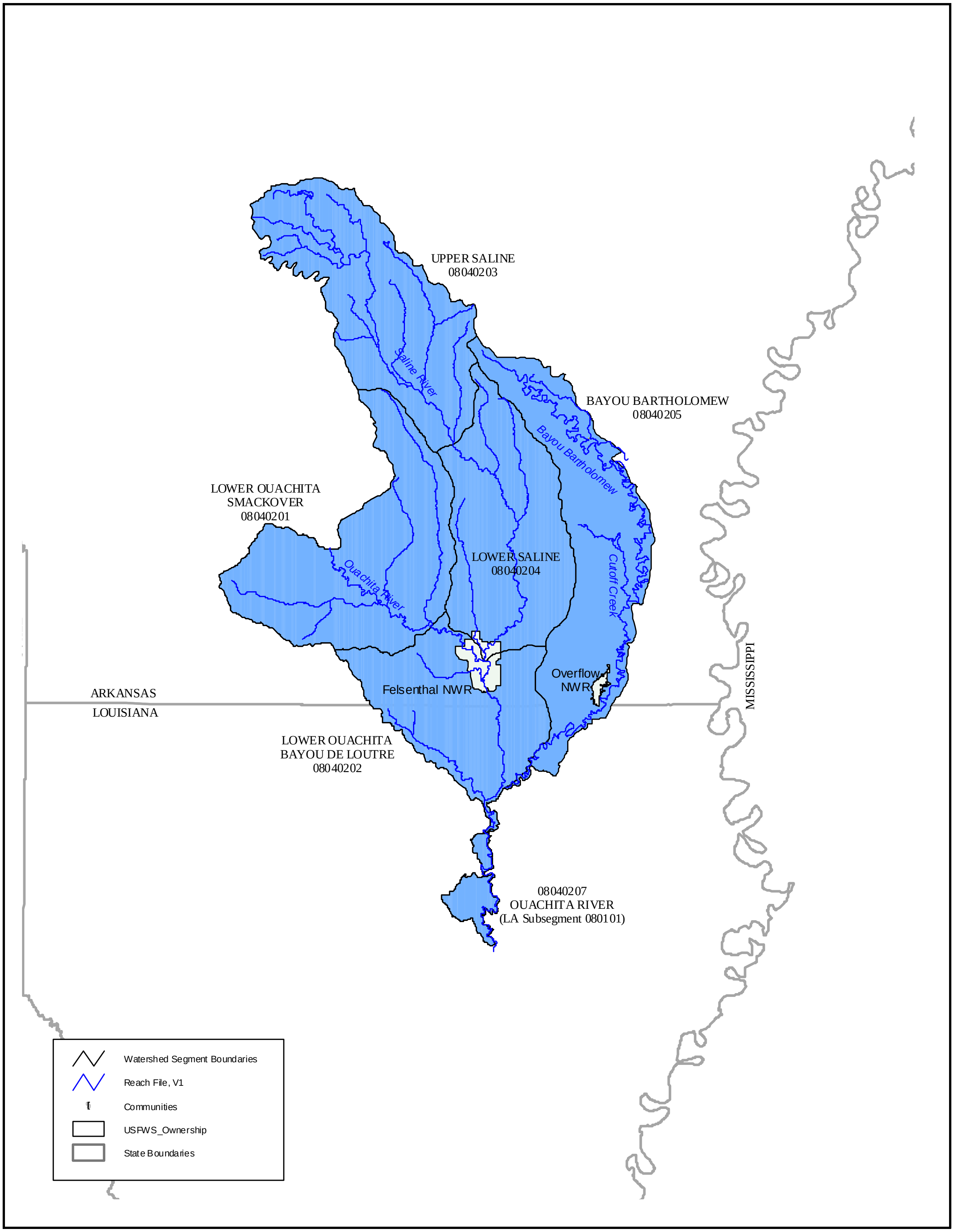

Figure 1.1. Drainage basin for the study area.

2.0 DESCRIPTION OF WATERBODIES

The TMDL development is based on a basin-wide approach to the Ouachita River watershed. For this TMDL, the Ouachita River watershed has been defined to include the Ouachita River, Saline River, Bayou Bartholomew, and their tributaries located within the hydrologic unit code's (HUC) 08040201, 08040202, 08040203, 08040204, 08040205 (includes Louisiana Subsegments 080401 and 080402), and 08040207 (includes Louisiana Subsegment 080101) (Figure 2.1).

The Saline River and Ouachita River headwaters are in the Ouachita Mountain ecoregion and arise in the Ouachita Mountains of west central Arkansas. The upper section of each river drains a portion of the Ouachita Mountains, which are composed mostly of sandstone and shale. Near Malvern, Arkansas, the Ouachita River enters the South Central Plain ecoregion where the character of the river changes. Here the river gradient decreases significantly, and the river gradually changes into more of a lowland stream (lower riffle to pool ratio) (Figure 2.2). The Saline River enters the South Central Plain ecoregion near Benton, Arkansas, where the character of the river has similar changes to those of the Ouachita River.

The headwaters of Bayou Bartholomew begin northwest of Pine Bluff, Arkansas in the Mississippi Alluvial Plain ecoregion. Bayou Bartholomew meanders through southeast Arkansas and into northeast Louisiana before emptying into the Ouachita River near Sterlington, Louisiana. The watershed is located within both the South Central Plain and the Mississippi Alluvial Plain ecoregions.

2.1 Topography

The following description of the topography of the watershed was taken from county soil surveys (USDA 1958; 1967; 1968; 1972; 1973; 1976; 1979; 1980). The majority of the Ouachita and Saline Rivers watershed is in the South Central Plain ecoregion. The topography of this area can be described as nearly level or gently rolling to hilly uplands, terraces, and floodplains. Slopes are mainly 1% to 8% but can range from 0% to 20%. The Bayou Bartholomew watershed is in the Mississippi Alluvial Plain and South Central Plain ecoregions. The topography of this area can be described as level to moderately steep, with the main topographic divisions consisting of rolling uplands, flatwood uplands, terraces, and floodplains. Slopes are mainly 1% to 8%, but range from 0% to 20%.

2.2 Soils

Soil characteristics for the watershed are also provided by the county soil surveys (USDA 1958; 1967; 1968; 1972; 1973; 1976; 1979; 1980). Most of the soils in the watershed are classified as loamy. Soil series that are common in the watershed area are Amy, Cahaba, Ouachita, Pheba, Savannah, Smithton, and Ruston. These soils are classified as silty loams or sandy loams.

2.3 Land Use

Land use in the watershed is predominantly forest land (Figure 2.3). Areas and approximate percentages of each land use in the watershed are listed in Table 2.1.

Prior to development, the watershed basin was predominantly covered with thick growths of hardwoods and pines. Only a small part of the basin was prairie. As settlers arrived in the early 1800s, agriculture grew steadily until the outbreak of World War II, and then declined. In the 1930s, reforestation efforts were begun to restore once cleared land to woodland. Lumbering has become the chief source of income. Much of the forested land is managed for the production of pulpwood, poles, and saw logs.

Farming practices are fairly uniform throughout the basin. Rice and cotton are typically planted in April through May and soybeans are planted later in May through June. Wheat is planted in October and November. Irrigation is primarily by flooding. Rice is flooded in May, soybeans are irrigated in June through July, and cotton is irrigated in July. Rice fields are typically drained in late August through September. Much of the land is bare from November through March.

2.4 Description of Hydrology

USGS daily stream flow data were retrieved for gages in the Ouachita River near Camden, Arkansas, in the Saline River near Rye, Arkansas, in Bayou Bartholomew near Garrett Bridge, Arkansas, and in the Ouachita River at the Arkansas/Louisiana state line. Basic information and summary statistics for these gages are summarized in Table 2.2.

Average annual precipitation for the watershed is approximately 54 inches (Hydrosphere 2000). Mean monthly precipitation totals for the watershed are shown on Figure 2.4. The mean monthly precipitation values are highest for January and lowest for August. Precipitation data from three stations within each of the five HUCs was used to calculate the annual and monthly mean precipitation for the watershed.

2.5 Point Sources

Information on NPDES point source discharges in the watershed was obtained by searching the Permit Compliance System (PCS) on the EPA website. The PCS search identified a total of 176 facilities with NPDES permits within the watershed. Of these 176 permitted facilities, 43 were city municipal wastewater treatment plants (WWTPs). ENSCO, Inc. (NPDES permit no. AR0037800) located in Union County was the only facility that was identified as having an NPDES permit limit for mercury. ENSCO has a facility flow rate of 1.29 MGD and a permit limit of 0.2 Fg/L for total recoverable mercury. None of the other NPDES facilities had permit mercury limits. However, ADEQ used clean sampling procedures and ultra-trace level analyses to sample for mercury in five municipal WWTPs in Arkansas during 1995 (Allen Price, personal communication 2001). The average mercury concentration for these WWTPs was 15 ng/L. Clean sampling procedures and ultra trace level analyses have not been used to sample any other types of facilities, so no information is available on mercury for these facilities. A listing of the NPDES permitted facilities in included in Appendix A.

Information on local air emission sources in the airshed (airshed is defined as all counties within 100 km of the Ouachita River watershed boundary) was obtained by searching the National Toxics Inventory (NTI) emission inventory on the EPA website. The NTI emission inventory includes point sources, area sources, and mobile sources. A search was done of the maximum achievable control technology (MACT) source category, which includes the number of sources and total hazardous air pollutant (HAP) emissions for each MACT source category included in the NTI. The database search for the airshed resulted in 373 air emission sources in 11 MACT source categories. The MACT standards are emission limitations developed under Section 112(d) of the Clean Air Act (National Emissions Standards for Hazardous Air Pollutants). The limitations are based on the best demonstrated control technology or practices in similar sources to be applied to major sources emitting one or more of the listed toxic pollutants. A listing of the air emission sources is included in Appendix B.

Table 2.1. Acreage and percent of land use categories in the Ouachita River basin.

Land Use	10^6 Acres (mi^2)	Percent
Forest	3.62 (5,657)	70.5
Pasture	0.4 (635)	7.9
Cropland	0.33 (514)	6.4
Wetland (forest/nonforested)	0.66 (1,026)	12.8
Water	0.02 (32)	0.4
Urban and Other	0.10 (155)	1.9
TOTAL	5.13 (8,020)	100

Table 2.2. Information for stream flow gaging stations.

	Ouachita River near Camden, Arkansas	Saline River near Rye, Arkansas	Bayou Bartholomew at Garrett Bridge, Arkansas	Ouachita River at Arkansas/Louisiana State Line
USGS gage number	07362000	07363500	07364133	07364100
Descriptive location	Ouachita County on US Highway 79 at Camden, 3.4 miles downstream from Ecore Fabre Bayou, at mile 354.1	Bradley County on State Highway 15, 3.6 miles southwest of Rye, at mile 71.0	Located in Lincoln County on downstream side of bridge on State Hwy 54, 1.9 miles upstream from Flat Creek at Garrett Bridge	Union City near Arkansas/Louisiana state line
Drainage area (mi^2)	5,357	2,102	380	10,787
Period of record	Oct. 1928 to Sept. 2000	Oct. 1937 to Sept. 2000	Oct. 1987 to April 2001	April 1958 to Sept. 1998
Mean flow (cfs)	7,653	2,601	565	4,581
Minimum flow (cfs)	125	4	0.3	190
Maximum flow (cfs)	238,000	72,500	5,210	19,200
Flow (cfs) that is exceeded:				
80% of the time	1,180	125	51	1,500
50% of the time	3,420	672	205	3,020
20% of the time	11,200	4,340	912	7,250

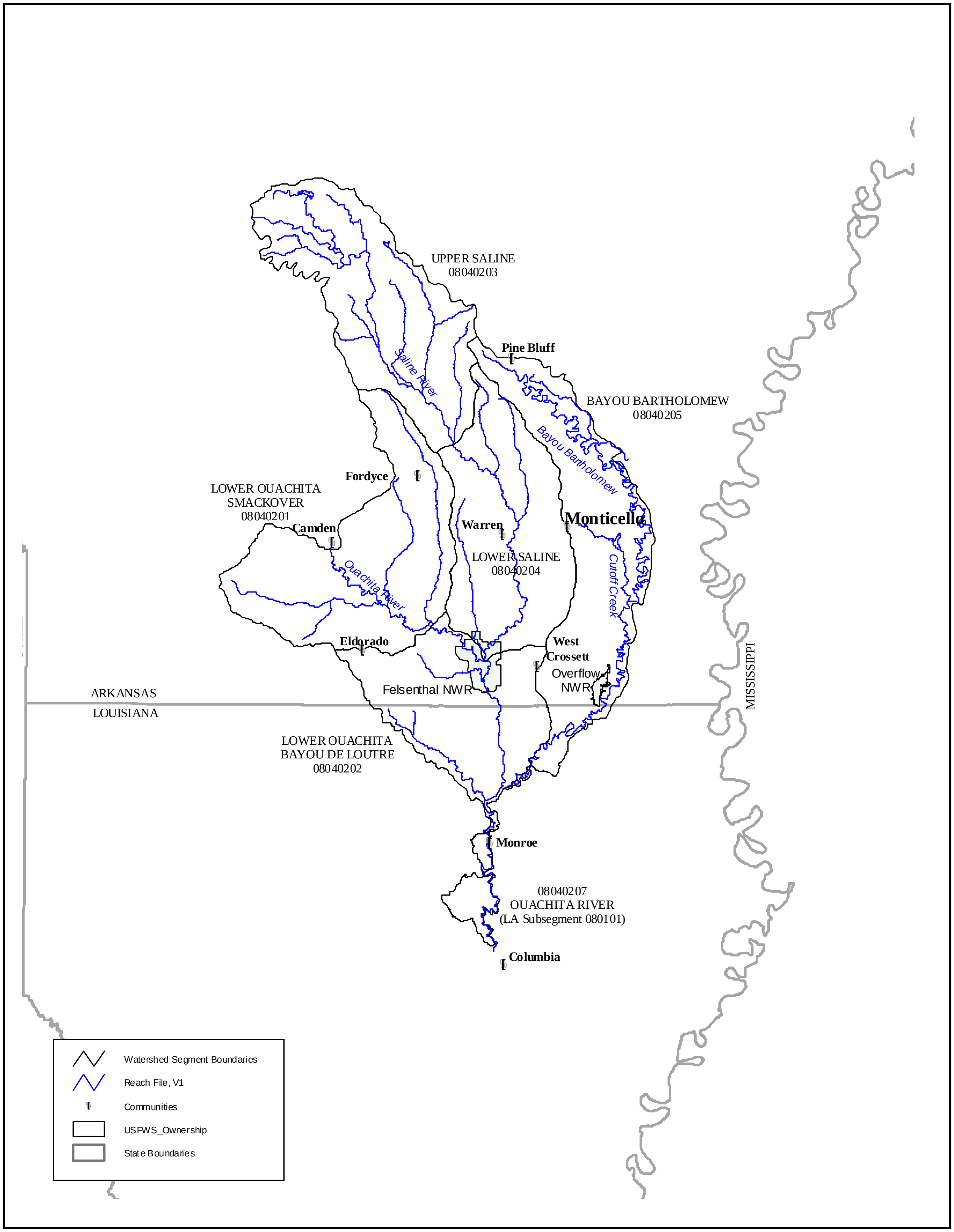

Figure 2.1. Ouachita River basin and associated HUC codes included in the TMDL.

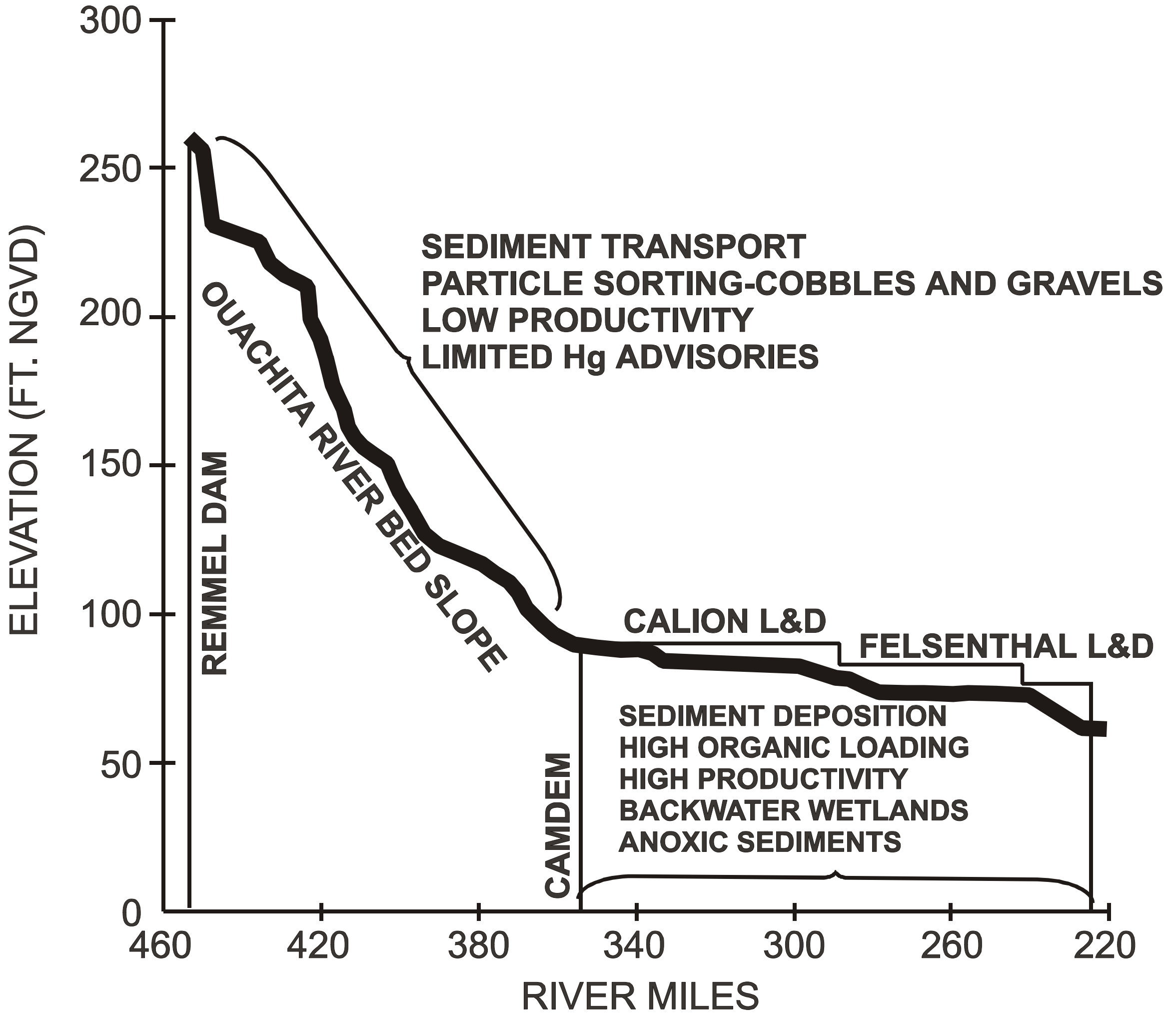

Figure 2.2. Differences in stream characteristics above and below Camden, which is the general vicinity where consumption advisories begin in the southern half of the state.

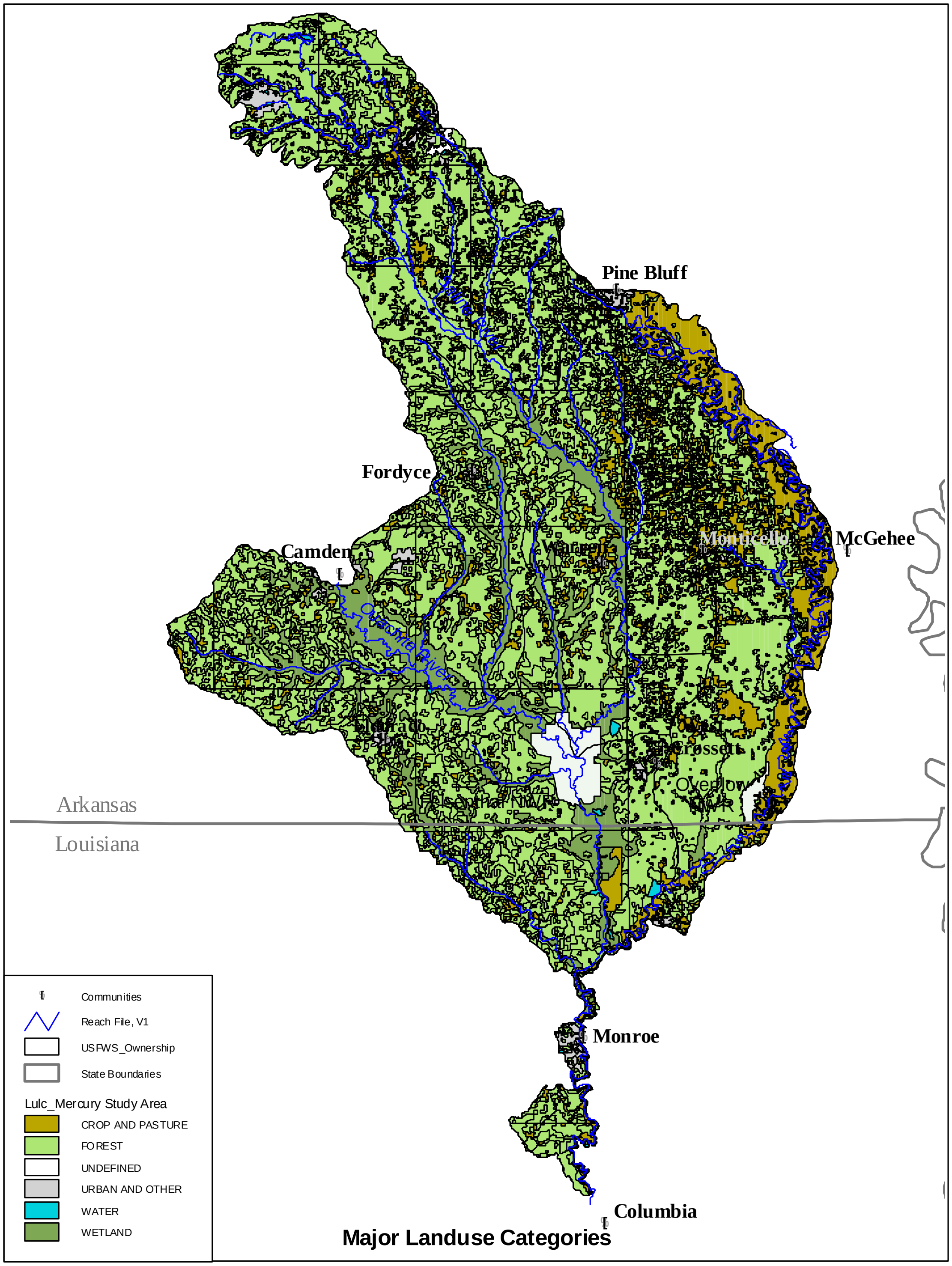

Figure 2.3. Land use within the Ouachita River basin.

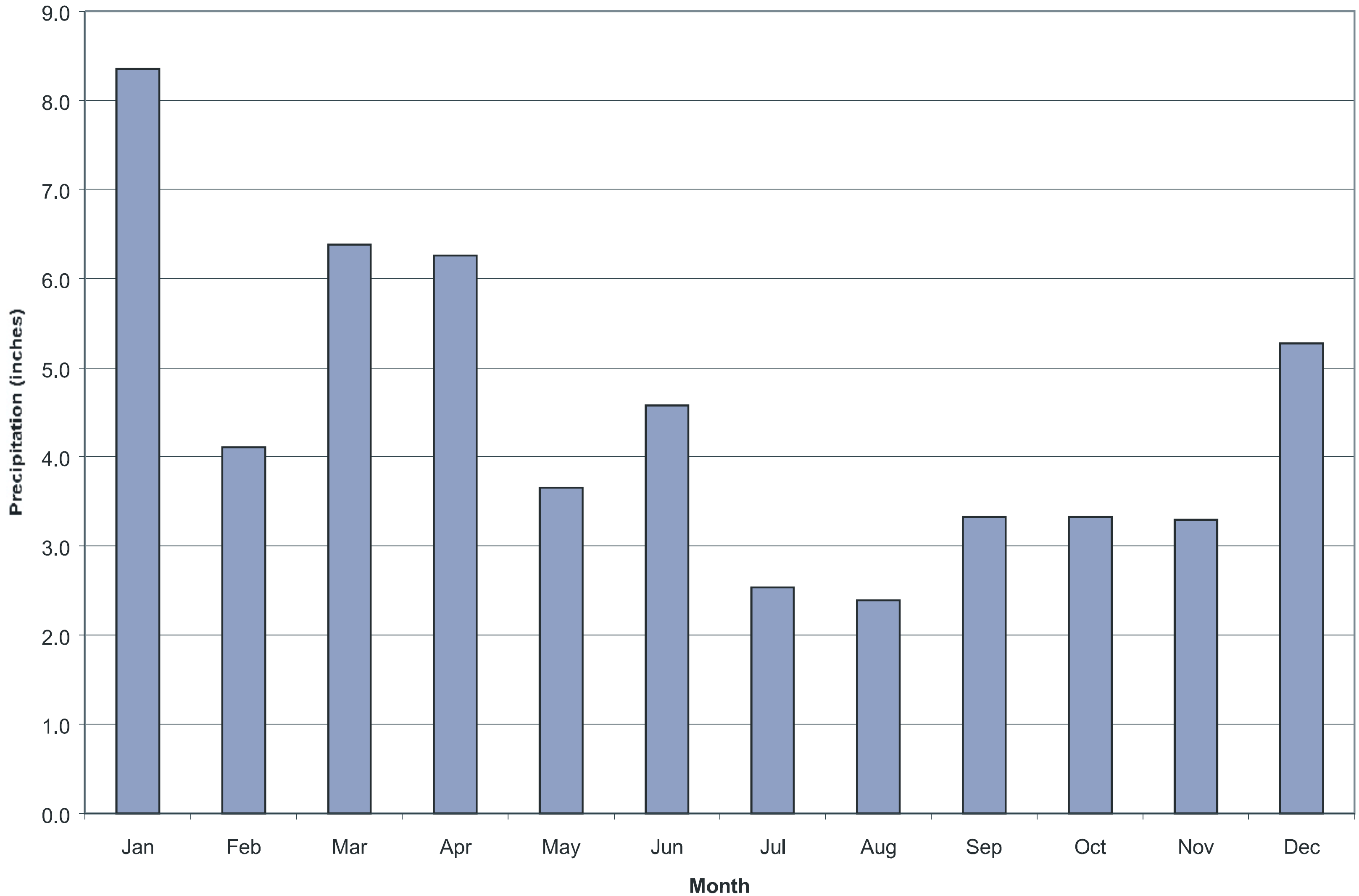

Figure 2.4. Mean monthly precipitation.

3.0 WATER QUALITY STANDARDS AND EXISTING WATER QUALITY CONDITIONS

3.1 Water Quality Standards

The State of Arkansas has developed water quality standards for waters of the State (ADEQ 1998). The standards are defined according to ecoregions and designated uses of the waterbodies. The Ouachita River basin lies within three ecoregions: the Ouachita Mountain ecoregion, the South Central Plain ecoregion, and the Mississippi Alluvial Plain ecoregion. Designated uses for the Ouachita River basin from Remmel Dam to the State of Arkansas Line include primary and secondary contact recreation, protection and propagation of fisheries, shellfish and other forms of aquatic life, domestic, industrial and agricultural water supply. Some waterbodies within the Ouachita basin are also designated as extraordinary resource waters, natural and scenic waterways, and ecologically sensitive waterbodies. The mercury water quality standard for Arkansas waters for all ecoregions is 0.012 Fg/L, expressed as total recoverable mercury. Although this water quality standard is to protect aquatic life, it was developed to protect humans from consuming aquatic life contaminated by mercury. There is no correction factor for hardness or other constituent concentrations. The narrative standard for toxic substances in Section 2.508 (Regulation No. 2, ADEQ 1998) is "Toxic substances shall not be present in receiving waters, after mixing, in such quantities as to be toxic to human, animal, plant, or aquatic life or to interfere with the normal propagation, growth, and survival of the indigenous aquatic biota."

The State of Louisiana has developed water quality standards for the State (LDEQ 1999). The designated uses for the Ouachita River from the State of Arkansas/Louisiana Line to Columbia Lock and Dam are primary and secondary contact recreation, propagation of fish and wildlife, and drinking water supply. Subsegment 080401 of Bayou Bartholomew is also designated as outstanding natural resource waters. The mercury water quality standard is 0.012 Fg/L as total recoverable mercury. There is no correction factor for hardness or other constituent concentrations. The narrative standard for toxic substances in Chapter 11 (IX Water Quality Regulations, LDEQ 1999) is "No substances shall be present in the waters of the state or the sediments underlying said waters in quantities that alone or in combination will be toxic to human, plant, or animal life or significantly increase health risks due to exposure to the substances or consumption of contaminated fish or other aquatic life."

3.2 Existing Water Quality Conditions

There have been no exceedances of the mercury water quality standard in the Ouachita River basin in Arkansas or Louisiana because of mercury. The analytical procedures used previously had a detection limit of 0.2 Fg/L and all samples were less than the detection limit.

However, there are fish consumption advisories for mercury contamination in portions of the Ouachita River, Saline River, and Bayou Bartholomew drainage areas in Arkansas and in the Ouachita River and Bayou Bartholomew from the Arkansas/Louisiana State Line to Columbia Lock and Dam, Louisiana. The fish consumption Action Level in Arkansas is based on the previous FDA guideline of 1 mg/kg. While Louisiana does not have an established Action Level, fish tissue mercury concentrations of approximately 0.5 mg/kg have triggered fish consumption advisories. Louisiana has a risk-based guideline for fish consumption advisories. The location of these fish consumption advisories are shown on Figure 3.1. Average composite bass fish mercury concentrations for the stations sampled in these waterbodies are also shown on Figure 3.1.

EPA recently promulgated a criterion for methyl-mercury in fish tissue. The EPA criterion is 0.3 mg/kg of methyl mercury in fish tissue (EPA 2001). The states will need to consider adopting this criterion as part of their triennial review.

This TMDL uses fish tissue monitoring data as a means to determine whether the "fishable" use is being met and the reductions needed to achieve the designated use. The "fishable" use is not attained if: (1) the fish and wildlife propagation is impaired and/or (2) if there is a significant human health risk from consuming fish and shellfish resources. The waters identified here, as indicated above, were either listed in the 1998 303(d) Lists based on elevated fish tissue mercury concentrations, and/or are in violation of narrative standards for toxic substances in both states. To achieve the designated use, the fish tissue mercury concentrations of 1.0 mg/kg (Arkansas) and 0.5 mg/kg (Louisiana) should not be exceeded. Therefore, the target level for all fish species in this TMDL will be 0.8 mg/kg (Arkansas) and 0.4 mg/kg (Louisiana). This incorporates a 20% Margin of Safety (MOS) in the analyses (Section 5.0).

3.3 Fish Sampling and Analysis

Both Arkansas and Louisiana followed the sampling protocols recommended in *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories*, Vol 1 (EPA 1995). Fish were collected from 1993 through 1999 throughout the Ouachita River basin, including the Ouachita River and its tributaries and lakes within the basin (Armstrong et al. 1995, LDEQ 1999). Fish mercury concentrations are listed in Table 3.1 and shown on Figure 3.1.

Water quality data were obtained for both Arkansas and Louisiana from the EPA STORET system. The stations, agency code, HUC, and period of record (POR) for this study are listed in Table 3.2. Water quality data are also summarized on Figures 3.2 through 3.4 for sulfate, total organic carbon (TOC), and pH. These three constituents have been demonstrated to be correlated with fish mercury concentrations and can affect the bioaccumulation and bioavailability of mercury for methylation and subsequent uptake of methylmercury through the food chain (Armstrong et al. 1995, EPA 1998). The overlapping ranges of moderate sulfate and TOC concentrations with lower pH values in the lower portion of the Ouachita River basin provides an environment conducive to microorganisms that methylate mercury (Armstrong et al. 1995). These conditions likely contribute to the elevated fish mercury concentrations in this area. In addition, significant wetland acreage is also located in this portion of the Ouachita River basin. Wetland ecosystems have conditions that are particularly suited to organisms that methylate mercury (Rudd 1995). Felsenthal National Wildlife Refuge (NWR) contains about 16,000 acres of wetlands and mercury concentrations per unit size of fish are higher in Felsenthal NWR than in other water bodies in Arkansas (Armstrong et al. 1995).

Table 3.1. Maximum fish tissue Hg concentration mg/kg for largemouth bass and other species of concern in the Ouachita River Basin.

This List of stations and maximum Hg concentrations was derived from the fish tissue database provided by ADEQ. The data was compiled by FTN Associates.	**Bass (includes largemouth and spotted bass species)**	**Others (includes all other species collected)**	
Station	**Max Hg Concentration mg/kg**	**Max Hg Concentration mg/kg**	**Others Common Name**
BAYOU BARTHOLOMEW AT BAXTER	1.29		
BAYOU BARTHOLOMEW AT HWY 425 LA	1.39		
CALION LAKE	1.02		
CHAMPAGNOLLE CREEK	1.34	1.52	BOWFIN
CORNIE BAYOU	0.90		
DOLLAR SLOUGH AREA OF FELSENTHAL NWR	2.64	0.70	DRUM
LAKE FELSENTHAL	1.10		
LAKE WINONA	1.48		
LOWER OUACHITA RIVER ABOVE CAMDEN	0.45	<0.2	SUCKERS
LOWER OUACHITA RIVER AT DALLAS CO. ACCESS	0.55	0.29	SUCKERS
LOWER OUACHITA RIVER BELOW TWO BAYOU	0.59		
MORO CREEK ABOVE STATE PARK	1.42	1.41	SPOTTED GAR
MORO CREEK AT HWY 160	1.56	1.58	CHANNEL CATFISH
MORO CREEK AT HWY 275	0.90	1.18	BOWFIN
OUACHITA AND SALINE RIVERS NEAR CONFLUENCE	2.44	0.46	SMALLMOUTH BUFFALO
OUACHITA R- PIGEON HILL	1.40	0.40	BLACK CRAPPIE
OUACHITA R.- BELOW FELSENTHAL	1.36	1.86	FLATHEAD CATFISH
OUACHITA RIVER ABOVE CAMDEN	0.71	0.65	REDHORSE
OUACHITA RIVER- ABOVE LAPILE CREEK	0.21	0.61	BLUEGILL
OUACHITA RIVER AT CHERRY HILL ACCESS	0.89		
OUACHITA RIVER AT DALLAS CO. ACCESS	0.41	0.25	SUCKERS
OUACHITA RIVER AT GRIGSBY FORD	0.52	0.75	REDHORSE
OUACHITA RIVER BELOW HWY. 82	2.41	0.43	SMALLMOUTH BUFFALO
OUACHITA RIVER AT MCGUIRE ACCESS	0.60		
OUACHITA RIVER AT PIGEON HILL	1.10	0.80	SUCKERS
OUACHITA RIVER BELOW CALION L&D		1.38	FLATHEAD CATFISH
OUACHITA RIVER BELOW COFFEE CREEK	1.20		

Table 3.1. Continued.

Station	Max Hg Concentration mg/kg	Max Hg Concentration mg/kg	Others Common Name
OUACHITA RIVER BELOW COVE CREEK (REMMEL DAM)	0.46	0.40	GOLDEN REDHORSE
OUACHITA RIVER BELOW SMACKOVER CREEK	1.13	0.52	CARP
OUACHITA RIVER BELOW TATES BLUFF	0.35	0.37	REDHORSE
OUACHITA RIVER BELOW WEST TWO BAYOU	0.70		
OUACHITA RIVER NEAR FRIENDSHIP	0.55		
OUACHITA RIVER NR ODEN	0.98		
SALINE R. BELOW L'AIGLE CREEK	1.78	1.50	CRAPPIE
SALINE RIVER - ASHLEY AND BRADLEY COUNTIES	1.70		
SALINE RIVER AT COWFORD'S ACCESS, CLEVELAND CO.	1.09	0.52	DRUM
SALINE RIVER AT HIGHWAY 4	1.72	0.91	DRUM
SALINE RIVER AT HWY. 79	0.84	0.48	BLACK CRAPPIE
SALINE RIVER AT I-30 BRIDGE	0.80		
SALINE RIVER AT JENKINS FERRY	0.78	0.72	REDHORSE
SALINE RIVER AT LEES FERRY	0.64	0.81	CHANNEL CATFISH
SALINE RIVER AT LONGVIEW ACCESS, ASHLEY CO.	0.99	1.90	DRUM
SALINE RIVER AT MT. ELBA	1.87	1.13	CHANNEL CATFISH
SALINE RIVER AT OZMENT BLUFF, DREW CO.	1.10	1.47	REDHORSE
SALINE RIVER AT PRAIRIE ISLAND ACCESS BRADLEY CO.	0.66	1.29	BLACK CRAPPIE
SALINE RIVER- FITZHUGH ACCESS	0.86	0.56	BLACK CRAPPIE
SALINE RIVER NR EAGLE CREEK, BRADLEY CO.	1.79	1.84	FLATHEAD CATFISH
SHALLOW LAKE AREA OF FELSENTHAL NWR	1.34	1.36	SPOTTED GAR
SMACKOVER CREEK	0.97	0.71	BOWFIN
WILDCAT-FELSENTHAL	1.91	1.51	BLACK CRAPPIE
OUACHITA RIVER NEAR STATE LINE	1.02	1.45	DRUM
OUACHITA RIVER NEAR STERLINGTON LA	1.24	0.92	BLACK CRAPPIE
OUACHITA RIVER NEAR RIVERTON	1.07	0.99	DRUM
OUACHITA RIVER NEAR COLUMBIA	0.37	1.56	BOWFIN
GRAYS LAKE - CLEVELAND CO.	1.08	0.74	BOWFIN

Table 3.2. Water quality monitoring stations in the Ouachita River basin, agencies, HUC, and POR.

ID	Station	Agency	HUC	POR
50357	OUA137A	1116APCC	08040201	94-97
50039	OUA02	1116APCC	08040206	92-present
50042	OUA05	1116APCC	08040206	92-present
50046	OUA08A	1116APCC	08040202	92-present
50285	OUA08B	1116APCC	08040202	92-97
50094	OUA10A	1116APCC	08040204	92-present
50277	OUA117	1116APC	08040204	92-present
50278	OUA118	1116APCC	08040204	92-present
50358	OUA137B	1116APCC	08040201	94-97
50359	OUA137C	1116APCC	08040201	94-97
50360	OUA137D	1116APCC	08040201	94-97
50276	OUA16	1116APCC	08040203	92-present
50261	OUA18	1116APCC	08040203	92-present
50158	OUA26	1116APCC	08040203	92-present
50159	OUA27	1116APCC	08040201	92-present
50160	OUA28	1116APCC	08040201	92-present
50189	OUA37	1116APCC	08040201	92-present
50193	OUA42	1116APCC	08040203	92-present
50194	OUA43	1116APCC	08040204	92-present
50266	OUA47	1116APCC	08040201	92-present
05UWS030	UWCHCO1	21ARAPCC	08040201	94-96
B080190020	580010018	21LA10RS	08040206	92-98
S081465010	58010068	21LA10RS	08040206	92-98
S080190020	58010018	21LA10RS	08040206	92-98
B083305010	58010015	21LA10RS	08040206	92-98
50051	OUA13	1116APCC	08040205	90-98
50165	OUA33	1116APCC	08040205	90-98
05UWS036	UWBYB01	21ARAPCC	08040205	94-96
05UWS040	UWBYB02	21ARAPCC	08040205	94-98
05UWS041	UWBYB03	21ARAPCC	08040205	94-98
05UWS038	UWCOC01	21ARAPCC	08040205	94-98
05UWS039	UWCOC02	21ARAPCC	08040205	94-98

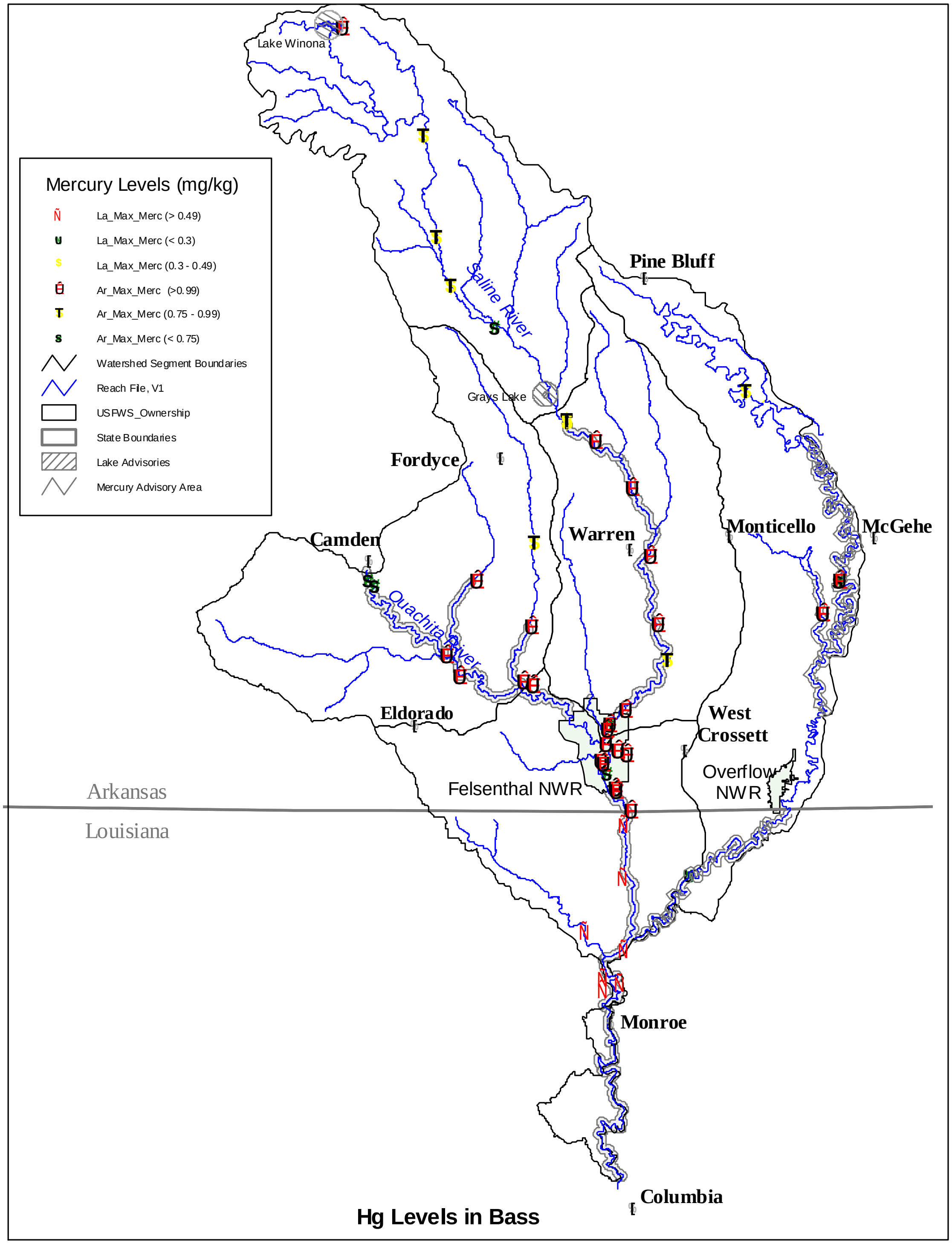

Figure 3.1. Fish consumption advisory areas in the Ouachita River basin. Fish tissue Hg concentrations for composite samples are shown on the map. NOTE: LA uses a risk-based level of 0.5 mg/kg Hg in fish tissue while AR Action Level is 1.0 mg/kg.

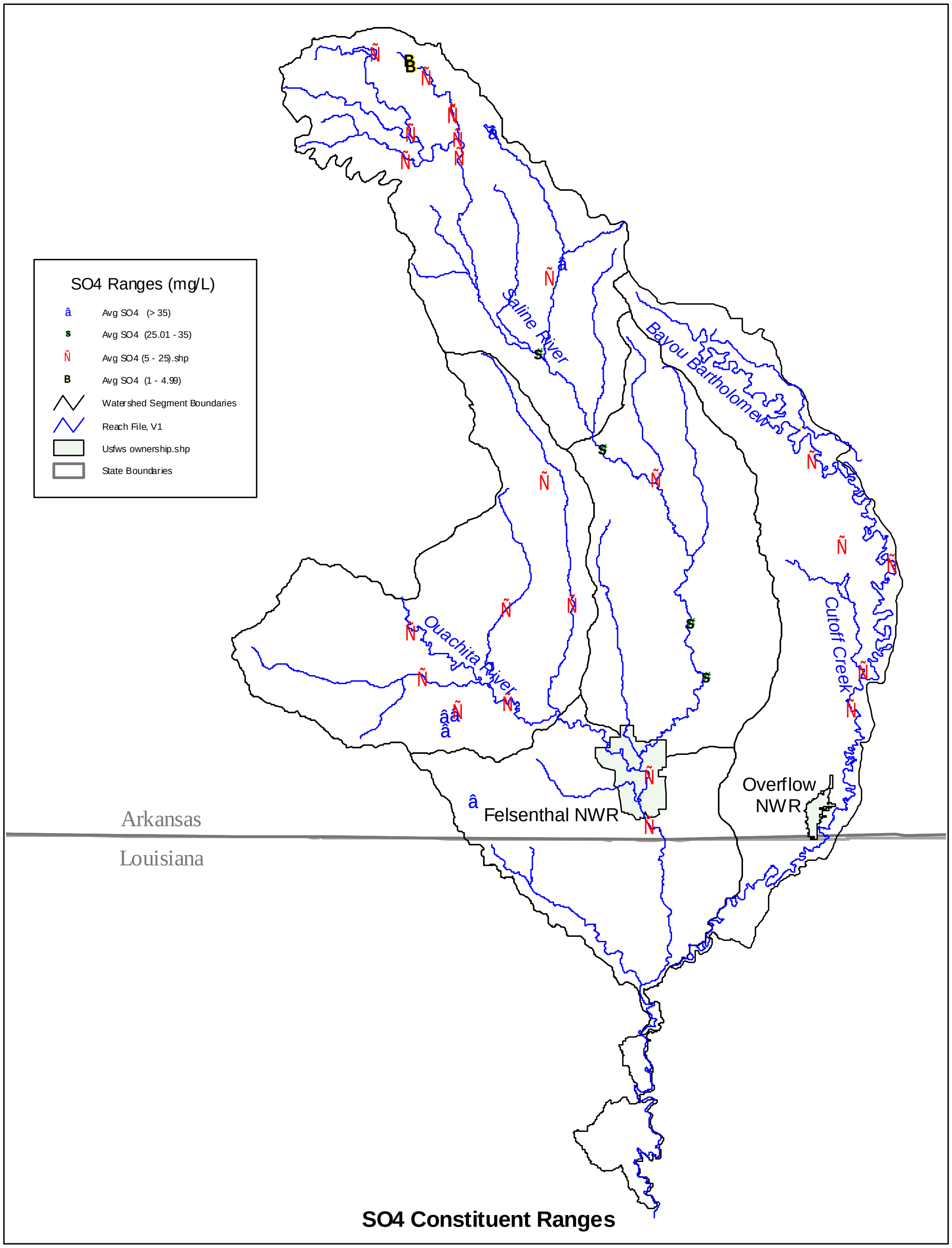

Figure 3.2. Average sulfate concentration (mg/L) ranges in the Ouachita River basin. Higher sulfate concentrations might stimulate sulfate reducing bacteria and increase mercury methylation.

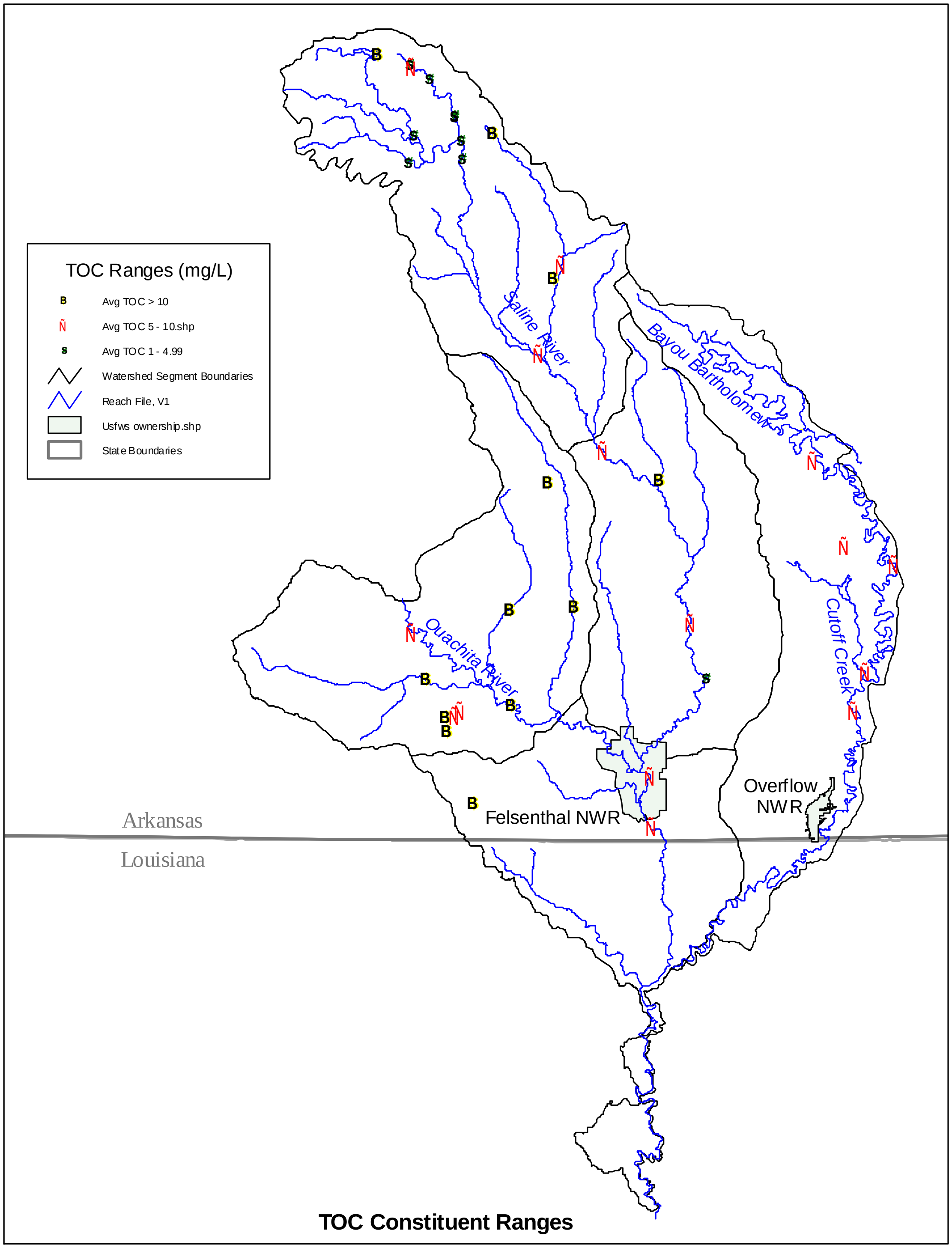

Figure 3.3. Average TOC concentration (mg/L) ranges in the Ouachita River basin. TOC can serve both as a carbon source for bacteria and also chelate Hg so it is less biologically available.

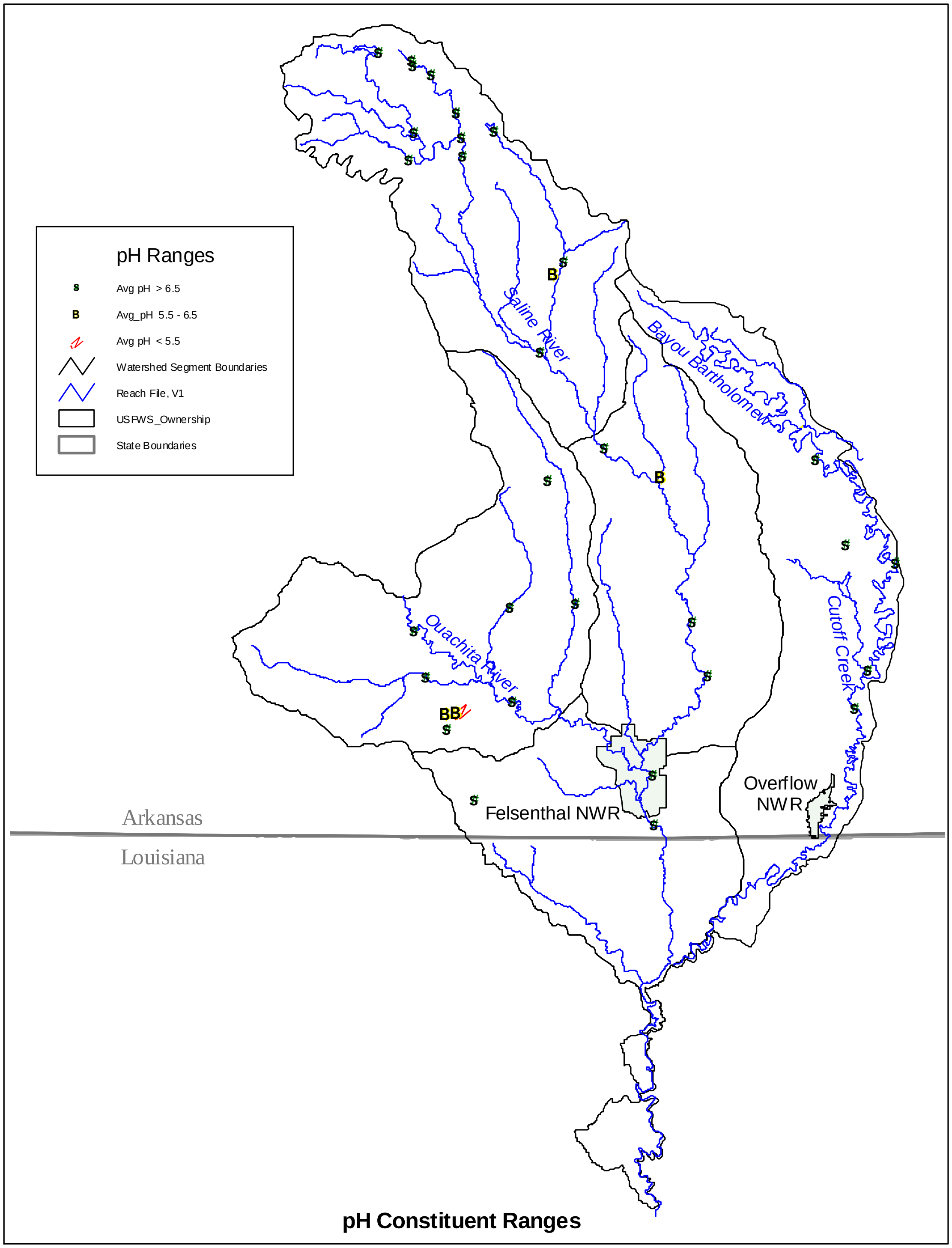

Figure 3.4. Average pH value ranges for Ouachita River basin. Lower pH values (e.g., <5.5) can be associated with higher methylmercury concentrations.

4.0 DEVELOPMENT OF THE TMDL

4.1 Loading Capacity

The loading capacity of water bodies differs based on a site specific basis due to (1) inputs or load of mercury to the waterbody, (2) environmental conditions within the waterbody that mediate methylation and bioaccumulation, and (3) the food web or food chain through which mercury bioaccumulates (Armstrong et al. 1995). Currently, the waterbody concentrations of mercury and methylmercury are unknown. In the future, clean sampling and analysis procedures might facilitate the estimation of loading capacity through water column monitoring.

4.2 Conceptual Framework

Mercury is unlike many other metals because it has a volatile phase at ambient temperatures and can be transported in a gaseous, soluble, or particulate form (Figure 4.1). Mercury is emitted to the atmosphere in both elemental gaseous Hg(0) and divalent Hg(ii) forms. Anthropogenic direct emissions, natural emissions, and indirect re-emission of previously deposited mercury are major sources of mercury to the atmosphere (Figure 4.1). Gaseous Hg(0) is relatively insoluble and is capable of being transported long distances. However, ozone or other oxidizing agents in the atmosphere can convert Hg(0) to Hg(II). Hg(II) is much more soluble and can sorb onto particulates, resulting in both wet and dry mercury deposition within local (i.e., 100 km from the source, EPA 2001) and regional areas (EPRI 1994). Some Hg(II) can also be chemically reduced to Hg(0). Hg(0) can be transported long distances and contribute to regional and global background concentrations.

Local sources of atmospheric mercury are typically within about a 100 km radius of a site (EPA 2001). Regional sources of atmospheric mercury are loosely defined as other sources within a geographical area such as the Southeast, South, or Upper Midwest, while global sources include intercontinental contributions of mercury. Atmospheric mercury deposition can include contributions from all three sources.

In addition to atmospheric deposition, mercury can also enter waterbodies from point source effluent discharges and watershed nonpoint source contributions. These watershed nonpoint sources include both naturally occurring mercury (e.g., geology, soils), and anthropogenic mercury in soils from atmospheric deposition, current and historical (Figure 4.1).

The primary mercury species of concern for bioaccumulation and biomagnification through the food chain, is the organic or methylmercury form (Figure 4.2). It is the transformation of inorganic mercury to organic or methylmercury that results in its accumulation and biological magnification through the food chain (Figure 4.2). Methylmercury binds with protein in muscle tissue of fish and other living organisms. Methylmercury is lost very slowly from fish tissue, on the order of years (Trudel and Rasmussen 1997). Therefore, methylmercury concentrations continue to biomagnify or increase in concentration throughout the life of the fish as long as methylmercury is in the environment and in its prey species. Older, larger fish typically have higher mercury concentrations than younger, smaller fish.

Recent studies have found that although mercury sulfur complexes have low solubilities in water, complex polysulfidic mercury compounds have greater solubilities than would be indicated from considering only cinnabar, the mercury sulfide ore (Benoit et al. 1999, Paquette and Hely 1995). In addition, it is likely the neutral HgS compound moves across microbial cell membranes where the mercury is methylated or transformed from inorganic to organic mercury (Benoit et al. 2000). These microorganisms, such as sulfur reducing bacteria, live in anaerobic or zero dissolved oxygen environments in the sediments of wetlands, streams, rivers, and lakes or reservoirs. Reservoirs with anaerobic hypolimnions can also be suitable environments for methylating mercury. In addition, new reservoirs (i.e., less than 15 to 20 years old) create environments that are particularly suitable for methylating bacteria so fish tissue mercury concentrations in new reservoirs are typically higher than fish tissue mercury concentrations in older reservoirs. Wetlands also create environments that are very conducive to mercury methylation. This is important in Arkansas and Louisiana both because new reservoirs have been constructed in the Ouachita River basin and because there are extensive areas of wetlands in the Ouachita River basin, such as Felsenthal National Wildlife Refuge. Wetlands and new reservoirs contribute to elevated fish tissue mercury concentrations in the basin.

A number of studies have been done on sources of mercury exposure to fish in Arkansas (Armstrong et al. 1995, Lin and Scott 1997, Scott and McKimmey 1997, Shirley 1992). This work has led to the conclusion that the geology of the area contributes to mercury in Arkansas water bodies. Mercury concentrations in the Ouachita Mountains geologic formations ranged from 0.01 mg/kg to 3.0 mg/kg (Stone et al. 1995). Mercury was mined commercially in areas south of the Ouachita Mountains. The Ouachita River basin receives drainage from these areas of known high mercury geology (Figure 4.3). The mercury studies in Arkansas also found a high incidence of higher mercury concentrations in soils located over geologic formations with high mercury concentrations (Armstrong et al. 1995). Underlying parent geological material contributes to the formation of the overlying soils, particularly in these watersheds that have thin soils. The idea that mercury from geologic sources is contributing to high mercury levels in sediments and fish is well documented and accepted by the scientific community in Arkansas. Therefore, geologic sources are included in the mercury loading estimate and TMDL.

In summary, TMDLs for mercury must consider that mercury can exist as a gas as well as in solution or particulate forms. Mercury loads arise from atmospheric deposition contributed by both local and regional/global emission sources, point source effluent discharges, natural geological formations, and soils. However, after deposition or loading to the system, mercury can also be lost through volatilization and re-enter the atmospheric pool. It is the organic form as methylmercury that is biologically accumulated and magnified through the food chain. Once in fish, it is lost very slowly and continues to accumulate through time.

4.3 TMDL Formulation

A two step approach was used to estimate loading capacity and the reductions required to achieve the designated fishable use in the Ouachita River basin waterbodies. Loading was estimated from both point and nonpoint sources in the first step, while reductions were estimated based on safe fish tissue Hg concentrations in the second step.

4.3.1 Source Loading Estimates

Mercury sources to the Ouachita River and its tributaries included both nonpoint and point sources, corresponding with load and wasteload allocations, respectively.

4.3.2 Nonpoint Sources

Load allocation for nonpoint sources included regional atmospheric deposition inputs, local source contributions, and watershed geologic/erosional inputs and watershed soil/erosional inputs.

4.3.2.1 Atmospheric Deposition

Data for regional atmospheric deposition was obtained from the National Atmospheric Deposition Program website. There are no mercury deposition monitoring stations in the state of Arkansas, therefore the two monitoring stations closest to the watershed were utilized (for a map showing locations of all the NADP mercury deposition monitoring sites, see http://nadp.sws.uiuc.edu/mdn/sites.asp). Data from monitoring locations LA10, in Franklin Parish, Louisiana, and TX21, in Gregg County, Texas, were used to represent atmospheric deposition of Hg in the watershed (Figure 4.4). Station LA10 is approximately 70 miles from Felsenthal NWR and Station TX21 is approximately 175 miles from Felsenthal NWR. Station LA10 had data available for 1999 and station TX21 had data available for 1996 through 1999. The data from these stations is summarized in Table 4.1. The average value of the wet deposition at these two stations was 11.4 Fg/m^2/yr. An estimate of the total atmospheric deposition was based on the assumption that dry deposition ranges from 40% to 60% of wet deposition (EPA 2001). Assuming that dry deposition is 50% of wet deposition results in a total atmospheric deposition rate of 17.1 Fg/m^2/yr. Wet deposition is the mercury removed from the atmosphere during rain events. Dry deposition is the mercury removed from the atmosphere on dust particles, sorption to vegetation, gaseous uptake by plants or other processes during non-rainfall periods (EPA 1997).

Precipitation data was also available from the NADP website (NADP 2000) and is summarized in Table 4.1. This data was compared with precipitation data for the Ouachita River watershed obtained from Hydrosphere (2000) summarized in Table 4.1 (see Appendix C Ouachita River Precipitation Estimate). The Ouachita River watershed had more precipitation than the NADP stations (Table 4.1). Since wet deposition of mercury is related to precipitation, an area receiving more precipitation could be assumed to receive a greater loading of mercury through wet deposition. Therefore, the mercury deposition for the NADP stations was adjusted based on the precipitation data from the NADP sites and the Ouachita River watershed. A ratio of 1.24 was obtained by dividing the average annual precipitation of the Ouachita River watershed (1.33 m/yr) by the average annual precipitation at stations LA10 and TX21 (1.07 m/yr). Multiplying the total atmospheric deposition rate of 17.1 Fg/m^2/yr by the ratio of 1.24 resulted in a precipitation corrected total atmospheric deposition rate of 21.2 Fg/m^2/yr for the watershed. Since the dry deposition was assumed to be 50% of the wet deposition, it was included in the adjustment. The corrected total atmospheric deposition rate was within the range predicted for this area (3-30 Fg/m^2/yr) by the RELMAP model (EPA 1997). These data and calculations discussed above are shown in Table 4.1.

The precipitation corrected atmospheric deposition of 21.2 Fg/m^2/yr was used to determine the atmospheric deposition mercury loading to streams, lakes, reservoirs, and wetlands. Table 4.2 shows the area of each of the 5 HUCs that are included in this TMDL and Subsegment 080101 covered by streams, lakes, reservoirs, and wetlands (BASINS Version 2.0 1999). The sum of the stream, lake, reservoir, and wetland areas was multiplied by 21.2 Fg/m^2/yr to obtain an atmospheric mercury load of 58,961 g/yr.

4.3.2.2 Local and Regional Source Atmospheric Deposition

The Louisiana and Texas mercury deposition monitoring stations, include both local emission sources similar to those in Arkansas and regional/global input. Local atmospheric deposition for the watershed was estimated based on data from the EPA Office of Air Quality Planning and Standards National Toxics Inventory (NTI) database. The NTI is a complete national inventory of stationary and mobile sources that emit hazardous air pollutants (HAPs). Data from the NTI web site was downloaded using Maximum Achievable Control Technology (MACT) report format. The MACT report includes the number of sources and total 1996 HAP emissions for each MACT source category included in the NTI. MACT standards for emission limitations were developed under section 112(d) of the Clean Air Act. The limitations are based on the best demonstrated control technology or practices in similar sources to be applied to major sources emitting one or more of the listed toxic pollutants.

In this TMDL study, local sources are defined as sources within the watershed and within all counties within a distance of 100 km around the watershed boundary. The area within which these local sources are located is referred to as the “airshed”. The NTI MACT report format has sources listed by county, therefore the airshed boundary is determined by county boundaries and if a portion of a county falls within 100 km of the watershed, then the entire county is included as part of the airshed. The airshed boundary for the watershed is shown on Figure 4.5. The airshed contains 160,672 km^2. The mercury emissions for each MACT category found within the airshed and the Hg(II) emissions calculated from the MACT data that contribute to the local atmospheric deposition are shown in Table 4.3. MACT categories not included in Table 4.3 (e.g., medical waste incineration) were not present in the airshed, but could contribute to the global/regional atmospheric mercury load.

The distance from the emission source, the forms of the mercury in the emissions, other pollutants in the emissions and the atmosphere, and the weather patterns of precipitation are important factors in determining where mercury released to the air will deposit. Divalent mercury (Hg(II)) is the dominant form of mercury in both rainfall and most dry deposition processes. An estimate of the Hg(II) emitted from MACT category sources in the airshed was calculated based on source speciation percentages. Since the watershed is only a fraction of the airshed the emitted mercury may or may not fall within the watershed boundary. Therefore, the mercury deposition rate to the watershed due to local sources was determined by dividing the Hg(II) emissions of the airshed (233,811 g/yr) by the airshed area (160,672 km^2). This calculation is a simplification of the methodology used in the Savannah River mercury TMDL (EPA 2001). The global/regional deposition rate was set equal to the precipitation corrected deposition rate (21.2 Fg/m^2/yr) minus the local source deposition rate (1.46 Fg/m^2/yr). Based on the analysis of the local sources, approximately 7% (4,053 g/yr) of the Hg deposition can be attributed to local sources and 93% (54,909 g/yr) can be attributed to global/regional sources.

4.3.2.3 Watershed Geologic Erosion and Previously Deposited Mercury Loading

Sediment load for the watershed was based on erosion rates of agricultural, barren, and forestland areas. The land use areas were based on information from Basins 2.0. Erosion rates were estimated based on information from USDA Natural Resource Conservation Service (Bloodworth and Berc 1998), Handbook of Nonpoint Pollution (Novotny and Chesters 1981), and Ozark-Ouachita Highlands Assessment Report (USDA FS 1999). Cropland erosion rates average 3.4 tons/year. Cropland with highly erodible soils have rates of 6.2 to 6.4 tons/year and cropland with soils that are not highly erodible have rates of 2.3 to 2.4 tons/year. Forestland erosion rates ranged from 0.2 to 0.8 tons/year. There was a small percentage of urban and barren land within the watershed. The areas associated with urban and barren land uses were included in the calculations with cropland erosion rates applied. Table 4.4 shows the total area, agricultural area, forestland area, and barren land area for each of the 5 HUCs and subsegment 080101. Percentages of land use are also included. Table 4.5 shows the sediment loads calculated by multiplying the erosion rates by the land use areas within each HUC and subsegment 080101, resulting in a tons/year of sediment.

Mercury contributions from both geologic/erosional and soil/erosional sources were estimated based on the estimated sediment loads, and are shown in Table 4.6. Given that geologic weathering contributes to soils, a portion of the mercury in soil would come from mercury sources in the underlying geology. In this TMDL study the portion of soil mercury contributed by geologic sources (soil/geologic erosion) was estimated and labeled as the background load. In addition, on-going and historical atmospheric mercury deposition over the past several decades, if not centuries, has also contributed mercury to the soils. While some of this mercury was likely re-emitted to the atmosphere, some of this previously deposited mercury would sorb to the soils and be transported to receiving waters. This portion of the load was the soil/deposited mercury erosion load.

Indirect atmospheric mercury contributions in overland flow during rain events was not estimated. The majority of the watershed is forested (Table 4.4), and overland flow during rain events in forested lands is minimal (Waring and Schlesinger 1985). Therefore, it was assumed that indirect atmospheric contributions via overland flow during rain events would not be significant.

A number of measurements of mercury in rock formations in the Ouachita Mountains (Stone et al. 1995) and soils in the Ouachita River basin (Figure 4.6) were available (Armstrong et al. 1995). Mercury concentrations measured in both rock and soils in Arkansas exhibited a large degree of variability (Figure 4.7). To get an idea of the range of possible soil/geologic erosion and soil/deposited mercury erosion loads, three loads were calculated. The upper boundary load was calculated using 90th percentile rock (0.25 mg/kg) and soil (0.3 mg/kg) mercury concentrations measured in Arkansas. The lower boundary load was calculated using 10th percentile rock (0.01 mg/kg) and soil (0.02 mg/kg) mercury concentrations from the same data set. The load considered to be most realistic was calculated using the geometric mean of shale (0.09 mg/kg) and soil (0.16 mg/kg) mercury concentrations. Shale mercury was used for the most likely load calculation because it is very common in the Ouachita Mountains and is the most easily erodible rock analyzed (Armstrong et al. 1995). Therefore it was deemed the most likely to contribute to the load.

Estimates of the soil/geologic erosion mercury load were calculated by multiplying the rock mercury concentration by the tons of sediment per year to obtain the mercury in g/yr. The soil/deposited mercury erosion load was estimated by multiplying the non-geologic soil mercury concentration by the tons of sediment per year. The non-geologic soil mercury concentration was calculated as the soil mercury concentration minus the rock mercury concentration. Therefore, the upper boundary non-geologic soil mercury concentration was 0.05 mg/kg, the lower boundary concentration was 0.01 mg/kg, and the most likely concentration was 0.07 mg/kg. The loads calculated using these soil and rock concentrations are shown in Table 4.6.

4.4 Point Sources

There was only one NPDES permitted source with mercury limits in its permit. The point source discharge receiving stream is Boggy Creek. Boggy Creek drains to Bayou de Loutre. There is no fish advisory for Boggy Creek or Bayou de Loutre. To estimate the wasteload allocation, the NPDES point source discharge was assumed to be discharging at its permit mercury limit 24 hours/day, 7 days/week. This assumption is considered conservative because it is unlikely this occurs. In addition, it is assumed there was no mixing zone and an end-of-pipe wasteload allocation was used. This is consistent with the Great Lakes Initiative for managing bioaccumulative pollutants. Dilution is not assumed because of the persistence and non-conservative nature of mercury.

Municipal wastewater treatment facilities were also assumed to discharge some mercury because mercury at low levels has been measured in POTWs in Arkansas and other US regions. ADEQ conducted a monitoring study of five POTWs in Arkansas using clean sampling procedures and ultra-trace level analyses and found an average concentration of about 15 ng/L in municipal discharges (Allen Price, ADEQ, personal communication 2001). This mercury concentration was assumed for the municipal facilities within the basin and mercury wasteloads estimated for these sources.

4.4.1 NPDES Point Source

Table 4.7 shows the results of calculations for NPDES sources. ENSCO, Inc., AR, was the only NPDES permitted source found with a mercury limit in their permit. Their permit limit is 200 ng/L and their discharge was listed as 1.29 MGD. Multiplying these values together, and converting units, resulted in a mercury loading of 356 g/yr.

4.4.2 Municipal Wastewater Discharges

An estimate of the contribution of mercury to the watershed from municipal wastewater treatment (WWT) plants was also calculated (Table 4.8). The list of city municipal WWT plants was obtained from the PCS search done for NPDES permitted facilities (see Appendix A). An assumption was made for the mercury concentration in the wastewater discharge. The concentration used was 15 ng/L, which was multiplied by the discharge from the city WWT plants. Discharge rates were included in the results of the PCS search. The result was a mercury loading of 586 g/yr.

4.5 Fish Tissue Concentration Estimation

Load reduction estimates were obtained using the maximum observed fish tissue concentrations and back calculating the decrease in fish tissue concentration needed to result in a safe target fish tissue mercury concentration.

If the mercury body burden of the primary fish species of concern were reduced to <0.5 or <1.0 mg/kg in Louisiana and Arkansas, respectively, the water bodies would achieve their designated, fishable uses. Therefore, the mercury reduction required to achieve the designated uses was based on the required reduction in fish tissue mercury concentrations needed to achieve the safe target levels of 0.4 and 0.8 mg/kg fish tissue mercury concentrations in the Louisiana and Arkansas portions of the Ouachita River basin waterbodies, respectively. These safe target level tissue concentrations provide a 20% MOS for the state fish tissue mercury criteria. A linear relationship was assumed between mercury source reduction and reductions in fish tissue mercury concentrations. This relationship, is consistent with steady-state assumptions and the use of bioaccumulation factors. However, interactions of both inorganic and organic mercury with sulfide, organic carbon, and other water quality constituents can affect its bioavailability for both methylation and uptake (Armstrong et al. 1995; EPA 1997, 1998). In order to establish the reduction needed in key species, the worst case body burden was divided by the target safe level tissue mercury concentration. The worse case body burden was the highest average mercury concentration of filet samples of bass species sampled from the listed waters (Table 4.9). A hazard quotient is directly applied to estimate the load reduction (RF), as illustrated in the following equations:

RF = MC/SC, where

RF = Reduction Factor

MC = Measured tissue mercury concentration (worst case species of bass and water body average concentration, mg/kg wet weight)

SC = Safe tissue mercury concentration (with MOS, mg/kg wet weight)

and,

TMDL = (EL/RF) x SF, where

TMDL = total maximum daily load (average value in ng/m^2/d)

RF = Reduction Factor

EL = Existing total load (includes point and nonpoint sources)

SF = Site specific factor(s) (requires study, but could be based on measured sulfate, organic carbon, alkalinity or pH values that influence mercury methylation and bioaccumulation. Assumed to be 1 in this study).

This approach follows and builds on the precedence established in *Mercury TMDLs for Segments Within Mermentau and Vermillion-Teche River Basins* (EPA 2000).

To estimate the tota mercury (THg) and methylmercury (MeHg) concentrations that might be occurring in the water column, the average bioaccumulation factor (BAF) used in the EPA (1997) Mercury Report to Congress was used to back calculate to water MeHg concentrations (Table 4.10). The ratio of MeHg/THg is typically in the range of 0.1 to 0.3 (EPA 1998), so a MeHg/THg ratio of 0.2 was used to estimate water THg concentrations (Table 4.10). Both the

MeHg and THg concentrations appeared to be reasonable estimates of concentrations that might be expected in the Ouachita River basin.

4.6 Estimate of Fish Tissue Concentration From Sediment Mercury Concentrations

Sediment mercury concentrations were measured in the Ouachita River as part of the Arkansas Mercury Task Force assessment (Armstrong et al. 1995). These measured concentrations were used to estimate the mercury concentrations that might occur in fish in the system, both to assess the long-term potential of the sediments as a reservoir for mercury and to assess the potential of the sediments to contribute sufficient mercury to exceed mercury target safe levels in fish.

Sediment mercury concentration was measured in the Ouachita River and found to be relatively constant at about 0.05 mg/kg from Remmel Dam to Felsenthal National Wildlife Refuge (Figure 4.8). Estimates of the partitioning coefficient (K_d) and an equation for the relationship between sulfide concentrations and MeHg were obtained from Benoit et al. (2000).

The first step was to determine the amount of total dissolved mercury (C_w) based on the sediment concentration of 0.05 mg/kg (C_s). The relationship of K_d being equal to C_s divided by C_w was used to calculate the total dissolved mercury concentration. Then, the equation shown in Figure 4.9 was used to determine the fraction of dissolved mercury present as mercury sulfide (HgS^0) where x equals the log molar concentration of sulfide in the water. The resulting HgS^0 concentration is assumed to be bioavailable for conversion to MeHg. Finally, the bioaccumulation factor of 6.8×10^6 was applied to determine the fish tissue concentration.

Two K_d values were used to develop a range of sulfide concentrations that would be expected to result in fish tissue concentrations ranging from approximately 0.5 to 3.0 mg/kg. Table 4.11 shows the results of using a K_d equal to 1×10^4 and Table 4.12 shows the results of using a K_d equal to 1×10^5. Sediment mercury concentrations are sufficient to result in the range of mercury concentrations found in the fish in the Ouachita River basin.

4.7 Current Load

The total mercury load to the Ouachita River and its tributaries on both an annual and a daily basis is shown in Table 4.13. The municipal and NPDES permitted point source contributions are very small (<1%) compared to the atmospheric and watershed nonpoint source contributions. The upper boundary and most likely soil/deposited mercury erosion and soil/geologic erosional mercury loads account for the majority of the mercury load to the Ouachita River basin. With the lower boundary soil/deposited mercury erosion and soil/geologic erosional mercury loads, regional atomospheric deposition accounts for the majority of the mercury load to the Ouachita River basin. Therefore, soils, geology, and regional air deposition are the primary contributors to the mercury load in the Ouachita River basin.

4.8 TMDL

Based on the required reductions to achieve mercury target safe levels in fish, mercury loads to the Ouachita River basin should be reduced by a factor of 2 in Arkansas and 3 in Louisiana. The difference in mercury load reduction required in the two states reflects the difference in Action Levels for issuing fish consumption advisories. In Arkansas, the Action Level is 1.0 mg/kg, while in Louisiana the risk-based guideline for issuing fish consumption advisories is 0.5 mg/kg. While the Action Levels are different, recommended fish consumption for the general public in the advisory area is similar between the two states. The target mercury loads calculated using the Arkansas and Louisiana reduction factors are shown in Table 4.13. The load allocations for the Arkansas TMDL are shown in Table 4.14. The load allocations for the Louisiana TMDL are shown in Table 4.15. Annual mercury loads are used in the load allocations because the concern with this TMDL study is the long term accumulation of mercury, rather than short term acute toxicity events.

The total non-point source mercury load allocations were determined by reducing the loading rates for the regional sources of atmospheric deposition, local sources of atmospheric deposition, and soil/deposited mercury erosion until the total basin mercury load was less than the target basin mercury load (from Table 4.13). The same percent reduction was applied to all three of the sources (regional sources of atmospheric deposition, local sources of atmospheric deposition and soil/deposited mercury erosion). The background load was not reduced based on the assumption that the erosion rates for the rock to soil cannot be reduced. The total maximum loads and margins of safety were calculated from the target basin loads calculated in Table 4.13. Since the explicit margin of safety for this TMDL study was 20% (see Section 4.3), the target basin loads would be 80% of the total maximum load. Therefore the total maximum loads were calculated as the target basin loads divided by 0.8. The margins of safety were calculated as 0.2 times the total maximum loads.

Felsenthal NWR, Arkansas, also requires a factor of 3 reduction to achieve safe target levels, but Felsenthal is a special system in Arkansas. Felsenthal NWR is a relatively new reservoir, with impoundment occurring in 1985. New reservoirs typically have elevated concentrations of mercury in fish, but there is a decline in concentration after about 20 to 30 years with fish reaching concentrations sustained by external mercury loadings in about 25 to 30 years (Anderson et al. 1995). Fish mercury concentrations in Felsenthal NWR would be expected to decrease in the future, but the system should continue to be managed as a special system for mercury and fish consumption advisories.

4.8.1 Wasteload Allocation

The analysis of NPDES point sources in the watershed indicates that the cumulative loading of mercury from these facilities is less than 1% of the total estimated current loading. Even if this TMDL were to allocate none of the calculated allowable load to NPDES point sources (i.e., a wasteload allocation of zero), the applicable water quality standards for mercury would not be attained in the waterbody because of the very high mercury loadings from nonpoint and background sources. At the same time, however, EPA recognizes that mercury is an environmentally persistent bioaccumulative toxic with detrimental effects to human fetuses even at minute quantities, and as such, should be eliminated from discharges to the extent practicable. Taking these two considerations into account, this TMDL, therefore, provides that mercury contributions from the city municipal WWTPs not exceed the mercury water quality standard for Arkansas and Louisiana (12 ng/L). No change in mercury limits is provided for the NPDES point source with permit limits for mercury.

4.8.2 Load Allocation

If the nonpoint source and background mercury loads happen to be like those shown as the upper boundary and the most likely conditions, it would not be likely that the mercury loading to the Ouachita River basin could be reduced to the proposed total maximum loads. The background mercury load would be too great. Even with 100% reduction of the nonpoint source loads, the Ouachita River basin mercury load is greater than the proposed total maximum load.

However, if the nonpoint source and background mercury loads are more like those shown as the lower boundary conditions, it could be possible to reduce the Ouachita River basin mercury loading to the proposed total maximum load. A 65% reduction of nonpoint source inputs would be required to meet the Arkansas proposed total maximum load, and an 87% reduction of nonpoint source inputs would be required to meet the Louisiana proposed total maximum load.

Existing MACT regulations of mercury emissions will account for some of the needed reductions in mercury deposition in the Ouachita River basin. Final rules for mercury emissions are in effect for four of the MACT categories identified as local mercury sources to the Ouachita River basin. Table 4.16 lists these MACT categories and the expected reductions in their mercury emissions as a result of the implementation of the final rules. Overall, local sources of mercury deposition would be expected to be reduced by 22%. Existing regulations reducing mercury emissions from municipal waste combustion, medical waste incineration, and hazardous waste combustion are expected to reduce national mercury emissions by about 50% (see Section 6.0). Therefore, regional sources of atmospheric mercury deposition could also be expected to be reduced by about 50%.

Tables 4.17 and 4.18 show the mercury load allcations taking into account reductions in the atomospheric mercury load as a result of implementation of MACT regulations. In these tables the local atmospheric deposition load has been set to 78% of the current local atmospheric deposition load (shown in Table 4.13) to reflect the expected 22% reduction. The regional atmospheric deposition load in Tables 4.17 and 4.18 has been set to 50% of the current regional atmospheric deposition load (shown in Table 4.13) to reflect the expected 50% reduction. These tables also show reduced loads for the soil/deposited mercury source. Reducing atmospheric deposition should result in less mercury in soils from atmospheric deposition. The sum of the reduced atmospheric deposition load to the basin (Tables 4.17 and 4.18) is about 48% less than the current atmospheric deposition load to the basin (Table 4.13). Therefore, the soil/deposited mercury loading rate shown in Tables 4.17 and 4.18 was also reduced by 48% from the current soil/deposited mercury loading rate (Table 4.13). In almost all scenarios shown in Tables 4.17 and 4.18 the total basin mercury loads are greater than the target basin mercury loads. Therefore, the target basin mercury load cannot be met without further reductions in the mercury load. Mercury emission limits for additional source categories are either proposed or planned (EPA 2002a). Therefore, further reductions would be expected in both local and regional atmospheric mercury loads to the basin in the future. It is uncertain what the magnitude of these reductions would be.

Additional reductions in the basin mercury load may be possible with the application of best management practices (BMPs) to reduce erosion. Reducing erosion would reduce both the soil/deposited mercury erosion and the soil/geologic erosion mercury loads. Table 4.19 shows the reduced sediment loads to the Ouachita River basin that would occur if the erosion rates for agricultural and barren land uses were the same as the erosion rate for forestland (0.2 tons/acre/yr). This erosion rate is equivalent to approximately a 90% reduction in erosion from the agricultural and barren lands. Although it is not likely that implementing BMPs would actually reduce erosion rates on agricultural or barren lands this much, the erosion rate of 0.2 tons/acre/yr was used to show the best possible conditions for the basin. Tables 4.20 and 4.21 show load allocations using the reduced sediment load to calculate soil/deposited mercury and soil/geologic erosion mercury loads along with the expected reductions in atmospheric deposition used in Tables 4.16 and 4.17. The background loads in Tables 4.20 and 4.21 are about 30% lower than the background loads in the previous tables. The reductions brought the total basin mercury load to within 5% to 9% of the Arkansas reduction target basin load. The reduced total basin mercury loads were still over 45% greater than the Louisiana reduction target basin load.

Although it appears that these reductions will not reduce maximum fish tissue concentrations to the State action levels, they can reduce the average fish tissue concentrations to the State action levels. Table 4.22 lists the average of largemouth bass tissue mercury concentrations measured in the basin, and the reduction factors that would be required to reduce the average concentrations to the target concentrations used in this TMDL study. The average of these reduction factors was used to calculate the target total basin loads shown in Tables 4.23 and 4.24. The average of the Arkansas reduction factors was 1.5. The average of the Louisiana reduction factors was 1.8. Table 4.23 shows that the reduced basin mercury loads shown in Tables 4.20 and 4.21 are less than the Arkansas target basin load calculated using the reduction factor of 1.5. Table 4.24 shows that the reduced basin mercury loads shown in Tables 4.20 and 4.21 are less than the Louisiana target basin loads for the most likely and lower boundary scenarios calculated using the reduction factor of 1.8.

4.8.3 Unallocated Reserve

The conservative estimates used throughout these analyses, including the conservative reduction factors should provide an unallocated reserve for mercury loading to the Ouachita River and its tributaries.

Table 4.1. Deposition estimates for the Ouachita River basin.

NADP Data Summary			**Precipitation Data (1997 - 1999)**		**NADP Data Summary**		
Station	**Year**	**Rain Gauge (m/yr)**	**HUC**	**Avg. Precip. (m/yr)**	**Station**	**Year**	**Wet Total Hg Deposition (Fg/m^2/yr)**
TX21	1996	0.75	8040201	1.31	TX21	1996	9.0
TX21	1997	1.34	8040202	1.29	TX21	1997	13.0
TX21	1998	1.08	8040203	1.32	TX21	1998	11.6
TX21	1999	0.89	8040204	1.32	TX21	1999	10.3
LA10	1999	1.30	8040205	1.18	LA10	1999	13.3
			8040207	1.54			
	Average	1.07	Average	1.33		Average	11.4

Dry + Wet = Average wet x 1.5 = 17.1 Fg/m^2/yr
Atmospheric Deposition Correction Factor = 1.24
Precipitation Corrected Total Atmospheric Deposition Rate = 21.2 Fg/m^2/yr

Table 4.2. Mercury deposition load to streams, lakes, reservoirs, and wetlands in the Ouachita River basin.

	Atmospheric Deposition to Lakes, Reservoirs, Wetlands				
Subbasin	**Streams (acres)**	**Lakes Reservoirs (acres)**	**Wetlands (acres)**	**Lakes Reservoirs & Wetlands (km^2)**	**Hg Deposition (g/yr)**
8040201	–*	1,597	265,811	1,082.16	22,987
8040202	3,383	5,269	180,740	766.44	16,281
8040203	–	4,172	11,502	63.43	1.347
8040204	–	2,033	152,706	626.21	13,302
8040205	1,460	2,386	46,139	20228	4,297
Subsegment 08010	4,463	434	3,802	35.20	748
Total	9,306	15,891	660,700	2,775.72	58,961
Regional	(19.8 Fg/m^2/yr)				54,909
Local	(1.46 Fg/m^2/yr)				4,053

*No estimate of areas in streams and canals available in the BASINS land use data for these subbasins.

Table 4.3. Local source emissions within the airshed based on NTI MACT report data.

MACT Category	Number of Point Sources*	Total Emissions (lbs/yr)	Total Emission (kg/yr)	Hg(II) Speciation Percentag e	Hg(II) (g/yr)
0102 - Industrial Combustion Coord Rule: Industrial Boilers	44	65.35	29.64	30%	8,893
0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	1	16.22	7.36	30%	2,207
0105 - Industrial Combustion Coord Rule: Stationary Internal Combustion Engines	0	0.05	0.02	10%	2
0410 - Portland Cement Manufacturing	5	460.5	208.9	10%	20,890
0502 - Petroleum Refineries - Catalytic Cracking, Catalytic Reforming, & Sulfur Plant Units	2	2.09	0.95	30%	284
0801 - Hazardous Waste Incineration	2	200.8	91.10	20%	18,220
0802 - Municipal Landfills	0	0.76	0.35	0%	-
1626 - Pulp & Paper Production	14	462.1	209.6	30%	62,882
1803 - Utility Boilers: Coal	2	872.0	395.5	30%	118,660
1805 - Utility Boilers: Oil	5	0.56	0.25	30%	76
1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	18.70	8.48	20%	1,697
Total	75	2,099	952.2		233,811

*No estimate available for number of nonpoint sources.

Table 4.4. Erosion estimates for the Ouachita River basin, by subbasin.

Sources of erosion within the watershed								
		Agricultural Land		Forest Land		Barren Land		
Subbasin	Subbasin Area (acre)	(acre)	(% of Basin Area)	(acre)	(% of Basin Area)	(acre)	(% of Basin Area)	Total Percent of Basin
8040201	1,162,92 0	68,607	5.9	802,703	69	9,405	0.8	76
8040202	825,028	54,119	6.6	570,188	69	1,014	0.1	76
8040203	1,097,22 0	90,928	8.3	955,312	87	20,572	1.9	97
8040204	967,583	118,368	12.0	688,661	71	334	0.0	83
8040205	1,080,00 0	403,618	37.4	603,832	56	1,216	0.1	93
080101	97,482	11,523	11.8	66,457	68	–	0.0	80

Total Watershed	**5,230,233**	**747,163**	**14.3**	**3,687,153**	**70**	**32,541**	**0.6**	**85**

Table 4.5. Sediment load estimated for Ouachita River basin, by subbasin.

Sediment Loading							
	Agricultural Land		Forest Land		Barren Land		
Subbasin	Erosion Rate (tons/acre/ year)	Sediment (tons/year)	Erosion Rate (tons/ acre/year)	Sediment (tons/year)	Erosion Rate (tons/ acre/year)	Sediment (tons/year)	Total Sediment (tons/year)
8040201	2.4	164,657	0.2	160,541	2.4	22,572	347,769
8040202	2.4	129,886	0.2	114,038	2.4	2,434	246,357
8040203	2.4	218,227	0.2	191,062	2.4	49,373	458,662
8040204	2.4	284,083	0.2	137,732	2.4	802	422,617
8040205	2.4	968,683	0.2	120,766	2.4	2,918	1,092,368
080101	2.4	27,656	0.2	13,291	2.4	–	40.947
Total Watershed		1,793,192		737,431		78,098	2,608,721

Table 4.6. Load estimated from geologic sources in Ouachita River basin, by subbasin.

		Upper Boundary		Most Likely		Lower Boundary	
Subbasin	Total Sediment (tons/yr)	Geologic/ Erosional (g/yr)	Soil/ Erosional (g/yr)	Geologic/ Erosional (g/yr)	Soil/ Erosional (g/yr)	Geologic/ Erosional (g/yr)	Soil/ Erosional (g/yr)
8040201	347,769	78,874	15,775	28,395	22,085	3,155	3,155
8040202	246,357	55,874	11,175	20,115	15,645	2,235	2,235
8040203	458,662	104,025	20,805	37,449	29,127	4,161	4,161
8040204	422,617	95,850	19,170	34,506	26,838	3,834	3,834
8040205	1,092,368	247,749	49,550	89,190	69,370	9,910	9,910
080101	40,947	9,287	1,857	3,343	2,600	371	371
Total Watershed	2,608,721	591,658	118,332	212,997	165,664	23,666	23,666

Table 4.7. Mercury load estimated from NPDES permitted source, assuming permit limit equals the mercury concentration in the effluent.

HUC	Discharge (MGD)	Permit Limit Hg (ng/L)	Mercury (ng/day)	Mercury (g/yr)
ENSCO	1.29	200	9.77E+08	356

Table 4.8. Mercury load estimated from municipal wastewater treatment plants assuming an average concentration of 15 ng/L.

HUC	City Discharge (MGD)	Estimated HG (ng/L)	Mercury (ng/day)	Mercury (g/yr)
8040201	7.75	15	4.40E+08	161
8040202	7.44	15	4.22E+08	154
8040203	9.49	15	5.39E+08	197
8040204	3.62	15	2.05E+08	75
Total	28.3		1.61E+08	586

Table 4.9. Reduction Factor (RF) and percent reduction of current tissue mercury concentration needed to achieve fishable designated use.

Location	Maximum LMB Hg Concentration (mg/kg)	RF to Achieve Target Level*	Percent Reduction of Current Fish Tissue Mercury Concentration Needed to Achieve Target Level
Lake Winona	1.48	1.9	46
Grays Lake	1.08	1.4	26
Saline River			
Below L’Aigle Creek	1.78	2.2	55
Highway 4	1.72	2.2	53
Mt. Elba	1.87	2.3	57
Eagle Creek	1.79	2.2	55
Ouachita River			
Pigeon Hill	1.4	1.8	43
Champagnolle Creek	1.34	1.7	40
Moro Creek Hwy 160	1.56	2.0	49
Coffee Creek	1.20	1.5	33
Felsenthal	2.64	3.3	70
Hwy 82	2.41	3.0	67
Below Felsenthal	1.36	1.7	41
State Line, LA	1.02	2.6	61
Sterlington, LA	1.24	3.1	68
Riverton, LA	1.07	2.7	63

* Target Safe Level - 0.8 mg/kg AR, 0.4 mg/kg LA

Table 4.10. Water methylmercury concentrations back-calculated from fish tissue mercury concentrations. Total mercury concentrations estimated from MeHg: THg ratio.

Location	Maximum LMB Hg Concentration (mg/kg)	MeHg Conc. in Water Back-Calculated from BAF** (ng/L)	Total Hg Conc. in Water from MeHg:THg Ratio+ (ng/L)
Lake Winona	1.48	0.2	2.0
Grays Lake	1.08	0.2	2.0
Saline River			
Below L'Aigle Creek	1.78	0.3	3.0
Highway 4	1.72	0.2	2.0
Mt. Elba	1.87	0.3	3.0
Eagle Creek	1.79	0.3	3.0
Ouachita River			
Pigeon Hill	1.4	0.2	2.0
Champagnolle Creek	1.34	0.2	2.0
Moro Creek Hwy 160	1.56	0.2	2.0
Coffee Creek	1.20	0.2	2.0
Felsenthal	2.64	0.4	4.0
Hwy 82	2.41	0.4	4.0
Below Felsenthal	1.36	0.2	2.0
State Line, LA	1.02	0.2	2.0
Sterlington, LA	1.24	0.2	2.0
Riverton, LA	1.07	0.2	2.0

** BAF = 6.8 X 10^6 geometric mean (EPA 1997)

+ 0.2 MeHg:THg ratio used for conversion to THg

Table 4.11. Fish tissue mercury concentrations estimated from measured sediment concentrations, a portion coefficient of 1 X 10^4 and a range of sulfide concentrations.

Conversion of Hg concentration in sediment to Hg concentration in fish tissue. **K_d = 1.00E+04** Fraction as dissolved HgS = 0.002 x exp(-1.02 x log M sulfide conc)							
Hg Conc in Sediment (mg/kg)	**Dissolved Hg (K_d=C_s/C_w) (ng/L)**	**Sulfide Conc (moles/L)**	**Sulfide Conc (log M)**	**Fraction as Dissolved HgS**	**HgS to MeHg (ng/L)**	**BAF**	**Fish Tissue (mg/kg)**
0.05	5.0	9.00E-03	-2.0	0.02	0.08	6.80E+06	0.55
0.05	5.0	2.50E-03	-2.6	0.03	0.14	6.80E+06	0.97
0.05	5.0	9.00E-04	-3.0	0.04	0.22	6.80E+06	1.52
0.05	5.0	4.50E-04	-3.3	0.06	0.30	6.80E+06	2.07
0.05	5.0	2.00E-04	-3.7	0.09	0.44	6.80E+06	2.96

Table 4.12. Fish tissue mercury concentrations estimated from measured sediment concentrations, a portion coefficient of 1 X 10^5 and a range of sulfide concentrations.

Conversion of Hg concentration in sediment to Hg concentration in fish tissue. **K_d = 1.00E+05** Fraction as dissolved HgS = 0.002 x exp(-1.02 x log M sulfide conc)							
Hg Conc in Sediment (mg/kg)	**Dissolved Hg (K_d=C_s/C_w) (ng/L)**	**Sulfide Conc (moles/L)**	**Sulfide Conc (log M)**	**Fraction as Dissolved HgS**	**HgS to MeHg (ng/L)**	**BAF**	**Fish Tissue (mg/kg)**
0.05	0.5	5.00E-05	-4.3	0.16	0.08	6.80E+06	0.55
0.05	0.5	1.50E-05	-4.8	0.27	0.14	6.80E+06	0.93
0.05	0.5	5.00E-06	-5.3	0.45	0.22	6.80E+06	1.52
0.05	0.5	2.50E-06	-5.6	0.61	0.30	6.80E+06	2.06
0.05	0.5	1.00E-06	-6.0	0.91	0.45	6.80E+06	3.09

Table 4.13. Current mercury load calculated for Ouachita River basin and target loads to meet target safe level fish tissue concentrations.

Source Type	Upper Boundary			Most Likely			Lower Boundary		
	Loading Rate		Percent of Total Load	Loading Rate		Percent of Total Load	Loading Rate		Percent of Total Load
	(g/yr)	(g/d)		(g/yr)	(g/d)		(g/yr)	(g/d)	
Point Source									
NPDES Point Source	356	1	0.0%	356	1	0.1%	356	0.98	0.3%
City of Municipal WWT	586	2	0.1%	586	2	0.1%	586	1.61	0.6%
Non Point Source									
Regional Atmospheric Deposition	54,909	150	7.1%	54,909	150	12.5%	54,909	150	51.2%
Local Atmospheric Deposition	4,053	11	0.5%	4,053	11	0.9%	4,053	11	3.8%
Soil/Deposited Hg Erosion	118,332	324	15.4%	165,664	454	37.8%	23,666	65	22.1%
Background									
Geologic/Erosion	591,658	1,621	76.8%	212,997	584	48.6%	23,666	65	22.1%
Total	769,893	2,109	100%	438,564	1,202	100%	107,236	294	100%
Arkansas Reduction Factor	2	2		2	2		2	2	
Target Load to Meet Arkansas Target Fish Tissue Concentration	384,946	1,055		219,282	601		53,618	147	
Louisiana Reduction Factor	3	3		3	3		3	3	
Target Load to Meet Louisiana Target Fish Tissue Concentration	256,631	703		146,188	400		35,745	98	

Table 4.14. Arkansas mercury TMDL allocation for Ouachita River basin.

Source Type	Upper Boundary		Most Likely		Lower Boundary	
	Loading Rate (g/yr)	**Percent of Total Maximum Load**	**Loading Rate (g/yr)**	**Percent of Total Maximum Load**	**Loading Rate (g/yr)**	**Percent of Total Maximum Load**
Point Source (WLA)						
NPDES Point Source	356	0.1%	356	0.1%	356	0.5%
City Municipal WWT	586	0.1%	586	0.2%	586	0.9%
Non Point Source (LA)						
Regional Atmospheric Deposition	0	0.0%	1,098	0.4%	19,218	28.7%
Local Atmospheric Deposition	0	0.0%	81	0.0%	1,418	2.1%
Soil/Deposited Hg Erosion	0	0.0%	3,313	1.2%	8,283	12.4%
Background						
Geologic/Erosion	591,658	123.0%	212,997	77.7%	23,666	35.3%
Total Basin Load	592,600	123.2%	218,431	79.7%	53,528	79.9%
Percent reduction of nonpoint load	100%		98%		65%	
Margin of Safety (MOS)	96,237	20.0%	54,821	20.0%	13,404	20.0%
Total Maximum Load (g/yr)	481,183	100%	274,103	100%	67,022	100%

Table 4.15. Louisiana mercury TMDL load allocation for the Ouachita River basin.

Source Type	Upper Boundary		Most Likely		Lower Boundary	
	Loading Rate (g/yr)	Percent of Total Maximum Load	Loading Rate (g/yr)	Percent of Total Maximum Load	Loading Rate (g/yr)	Percent of Total Maximum Load
Point Source (WLA)						
NPDES Point Source	356	0.1%	356	0.2%	356	0.8%
City of Municipal WWT	586	0.2%	586	0.3%	586	1.3%
Non Point Source (LA)						
Regional Atmospheric Deposition	0	0.0%	0	0.0%	7,138	16.0%
Local Atmospheric Deposition	0	0.0%	0	0.0%	527	1.2%
Soil/Deposited Hg Erosion	0	0.0%	0	0.0%	3,077	6.9%
Background						
Geologic/Erosion	591,658	184.4%	212,997	116.6%	23,666	53.0%
Total Basin Load	592,600	184.7%	213,939	117.1%	35,350	79.1%
Percent reduction of nonpoint load	100%		100%		87%	
Margin of Safety (MOS)	64,158	20.0%	36,547	20.0%	8,936	20.0%
Total Maximum Load (g/yr)	320,789	100%	182,735	100%	44,682	100%

Table 4.16. Reductions in local atmospheric mercury sources based on existing MACT regulations.

MACT Category	Percent Reduction	Source	Current Hg(II) Load (g/yr)	Expected Hg(II) Load (g/yr)
410 - Portland Cement Manufacturing	24%	HAP metals reduction Table 7, Federal Register, June 4, 1999 Vol. 64 No. 113	20,890	15,876
0801 - Hazardous Waste Incineration	55%	EPA Hazardous Waste Combustion FAQs website	18,220	8,199
1626 - Pulp & Paper Products	59%	Table VII-2 Federal Register April 15, 1998 Vol. 63, No. 72	62,882	25,781
1807 - Industrial Combustion Coord Rule: Industrial, Commercial, and Other Waste Incineration	34%	Table 4 Federal Register December 1, 2000 Vol. 65	1,697	1,120
Airshed total local source mercury load			233,811	181,099

Table 4.17. Arkansas mercury TMDL allocation for Ouachita River basin with expected reductions in atmospheric mercury load based on existing MACT regulations.

Source Type	Upper Boundary		Most Likely		Lower Boundary	
	Loading Rate (g/yr)	Percent of Total Basin Load	Loading Rate (g/yr)	Percent of Total Basin Load	Loading Rate (g/yr)	Percent of Total Basin Load
Point Source (WLA)						
NPDES Point Source	356	0.1%	356	0.1%	356	0.6%
City Municipal WWT	586	0.1%	586	0.2%	586	0.9%
Non Point Source (LA)						
Regional Atmospheric Deposition	27,454	4.0%	27,454	8.3%	27,454	43.9%
Local Atmospheric Deposition	3,129	0.5%	3,129	0.9%	3,129	5.0%
Soil/Deposited Hg Erosion	61,532	9.0%	86,145	26.1%	12,306	19.7%
Background						
Soil/Geologic Erosion	591,658	86.4%	212,997	64.4%	23,666	29.9%
Total Basin Load	684,715		330,667		67,498	
Target Basin Load	384,946		219,282		53,618	
Percent Difference	77.9%		50.8%		25.9%	

Table 4.18. Louisiana mercury TMDL allocation for Ouachita River basin with expected reductions in atmospheric mercury load based on existing MACT regulations.

Source Type	Upper Boundary		Most Likely		Lower Boundary	
	Loading Rate (g/yr)	**Percent of Total Basin Load**	**Loading Rate (g/yr)**	**Percent of Total Basin Load**	**Loading Rate (g/yr)**	**Percent of Total Basin Load**
Point Source (WLA)						
NPDES Point Source	356	0.1%	356	0.1%	356	0.6%
City Municipal WWT	586	0.1%	586	0.2%	586	0.9%
Non Point Source (LA)						
Regional Atmospheric Deposition	27,454	4.0%	27,454	8.3%	27,454	43.9%
Local Atmospheric Deposition	3,129	0.5%	3,129	0.9%	3,129	5.0%
Soil/Deposited Hg Erosion	61,532	9.0%	86,145	26.1%	12,306	19.7%
Background						
Geologic/Erosion	591,658	86.4%	212,997	64.4%	23,666	29.9%
Total Basin Load	684,715		330,667		67,498	
Target Basin Load	256,631		146,188		35,745	
Percent Diference	166.8%		126.2%		88.8%	

Table 4.19. Sediment load estimated for Ouachita River basin, by subbasin, with reduced erosion rates for agricultural and barren land..

Sediment Loading							
	Agricultural Land		Forest Land		Barren Land		
Basin Code	Erosion Rate (tons/acre/ year)	Sediment (tons/year)	Erosion Rate (tons/ acre/year)	Sediment (tons/year)	Erosion Rate (tons/ acre/year)	Sediment (tons/year)	Total Sediment (tons/year)
8040201	0.2	16,466	0.2	160,541	2.4	2,572	179,263
8040202	0.2	12,989	0.2	114,038	2.4	243	127,270
8040203	0.2	21,823	0.2	191,062	2.4	4,937	217,822
8040204	0.2	28,408	0.2	137,732	2.4	80	166,221
8040205	0.2	968,683	0.2	120,766	2.4	2,918	1,092,368
Subsegment 080101	0.2	2,766	0.2	13,291	2.4	–	16.057
Total Watershed		1,051,134		737,431		10,436	1,799,001

Table 4.20. Comparison of reasonable mercury load reductions in Ouachita River basin to Arkansas target basin load.

Source Type	Upper Boundary		Most Likely		Lower Boundary	
	Loading Rate (g/yr)	Percent of Total Basin Load	Loading Rate (g/yr)	Percent of Total Basin Load	Loading Rate (g/yr)	Percent of Total Basin Load
Point Source (WLA)						
NPDES Point Source	356	0.1%	356	0.1%	356	0.6%
City Municipal WWT	586	0.1%	586	0.2%	586	1.0%
Non Point Source (LA)						
Regional Atmospheric Deposition	27,454	5.7%	27,454	11.5%	27,454	48.7%
Local Atmospheric Deposition	3,129	0.6%	3,129	1.3%	3,129	5.6%
Soil/Deposited Hg Erosion	42,433	8.8%	59,407	25.0%	8,487	15.1%
Background						
Soil/Geologic Erosion	408,013	84.7	146,885	61.8%	16,321	29.0%
Total Basin Load	418,972		237,817		56,332	
Target Basin Load	384,946		219,282		53,618	
Percent Difference	8.8%		8.4%		5.0%	

Table 4.21. Comparison of reasonable mercury load reductions in Ouachita River basin to Louisiana target basin load.

Source Type	Upper Boundary		Most Likely		Lower Boundary	
	Loading Rate (g/yr)	Percent of Total Basin Load	Loading Rate (g/yr)	Percent of Total Basin Load	Loading Rate (g/yr)	Percent of Total Basin Load
Point Source (WLA)						
NPDES Point Source	356	0.1%	356	0.1%	356	0.6%
City Municipal WWT	586	0.1%	586	0.2%	586	1.0%
Non Point Source (LA)						
Regional Atmospheric Deposition	27,454	5.7%	27,454	11.5%	27,454	48.7%
Local Atmospheric Deposition	3,129	0.6%	3,129	1.3%	3,129	5.6%
Soil/Deposited Hg Erosion	42,433	8.8%	59,407	25.0%	8,487	15.1%
Background						
Soil/Geologic Erosion	408,013	87.4%	146,885	61.8%	16,321	29.0%
Basin Load	418,972		237,817		56,332	
Target Basin Load	256,631		146,188		35,745	
Total Maximum Load (g/yr)	63.2%		62.7%		57.6%	

Table 4.22. Reduction Factor of average tissue mercury concentration needed to achieve fishable designated use.

Location	Average LMB Hg Concentration (mg/kg)	RF to Achieve Target Safe Level*
Lake Winona	0.74	0.9
Grays Lake	1.08	1.4
Saline River		
Below L'Aigle Creek	1.78	2.2
Highway 4	1.21	1.5
Mt. Elba	0.91	1.1
Eagle Creek	1.49	1.8
Ouachita River		
Pigeon Hill	1.18	1.5
Champagnolle Creek	1.01	1.3
Moro Creek Hwy 160	1.56	2.0
Coffee Creek	1.12	1.4
Felsenthal	1.13	1.4
Hwy 82	1.14	1.4
Below Felsenthal	1.36	1.5
State Line, LA	0.65	1.6
Sterlington, LA	0.98	2.4
Riverton, LA	0.52	1.8

* Target Safe Level - 0.8 mg/kg AR, 0.4 mg/kg LA

Table 4.23. Comparison of Arkansas target basin mercury load calculated using reduction factors based on average fish tissue concentrations to expected reduced basin loads as a result of implementation of MACT regulations and BMPs.

Source Type	Upper Boundary		Most Likely		Lower Boundary	
	Loading Rate (g/yr)	Percent of Total Basin Load	Loading Rate (g/yr)	Percent of Total Basin Load	Loading Rate (g/yr)	Percent of Total Basin Load
Point Source (WLA)						
NPDES Point Source	356	0.1%	356	0.1%	356	0.4%
City Municipal WWT	586	0.1%	586	0.2%	586	0.7%
Non Point Source (LA)						
Regional Atmospheric Deposition	27,454	5.7%	27,454	11.5%	27,454	30.7%
Local Atmospheric Deposition	3,129	0.6%	3,129	1.3%	3,129	3.5%
Soil/Deposited Hg Erosion	42,433	8.8%	59,407	25.0%	8,487	13.9%
Background						
Soil/Geologic Erosion	408,013	84.7%	146,885	61.8%	16,321	18.3%
Total Basin Load	481,972		237,817		56,332	
Target Basin Load	513,262		292,376		56,332	
Total Maximum Load	641,578		365,470		89,364	

Table 4.24. Comparison of Louisiana target basin mercury load calculated using reduction factors based on average fish tissue concentrations to expected reduced basin loads as a result of implementation of MACT regulations and BMPs.

Source Type	Upper Boundary		Most Likely		Lower Boundary	
	Loading Rate (g/yr)	**Percent of Total Basin Load**	**Loading Rate (g/yr)**	**Percent of Total Basin Load**	**Loading Rate (g/yr)**	**Percent of Total Basin Load**
Point Source (WLA)						
NPDES Point Source	356	0.1%	356	0.1%	356	0.6%
City Municipal WWT	586	0.1%	586	0.2%	586	1.0%
Non Point Source (LA)						
Regional Atmospheric Deposition	27,454	5.7%	27,454	11.5%	27,454	48.7%
Local Atmospheric Deposition	3,129	0.6%	3,129	1.3%	3,129	5.6%
Soil/Deposited Hg Erosion	42,433	8.8%	59,407	25.0%	8,487	15.1%
Background						
Soil/Geologic Erosion	408,013	87.4%	146,885	61.8%	16,321	29.0%
Total Basin Load	481,972		237,817		56,332	
Target Basin Load	427,718		243,647		59,576	
Total Maximum Load	534,648		304,559		74,470	

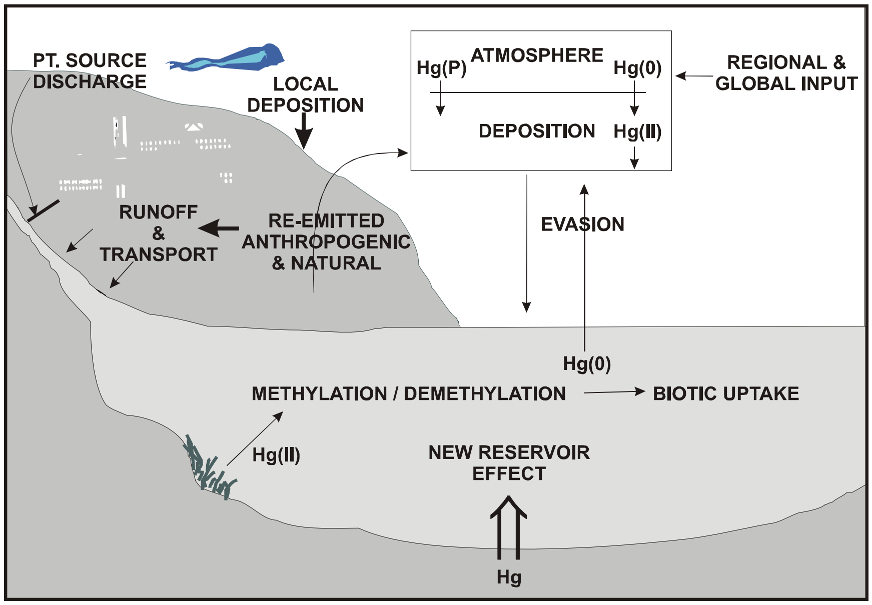

Figure 4.1. General mercury cycle showing atmospheric transport and deposition, point, nonpoint source and natural background contributions, and the effects of new reservoirs on mercury release into the environment (after Mason et al. 1994).

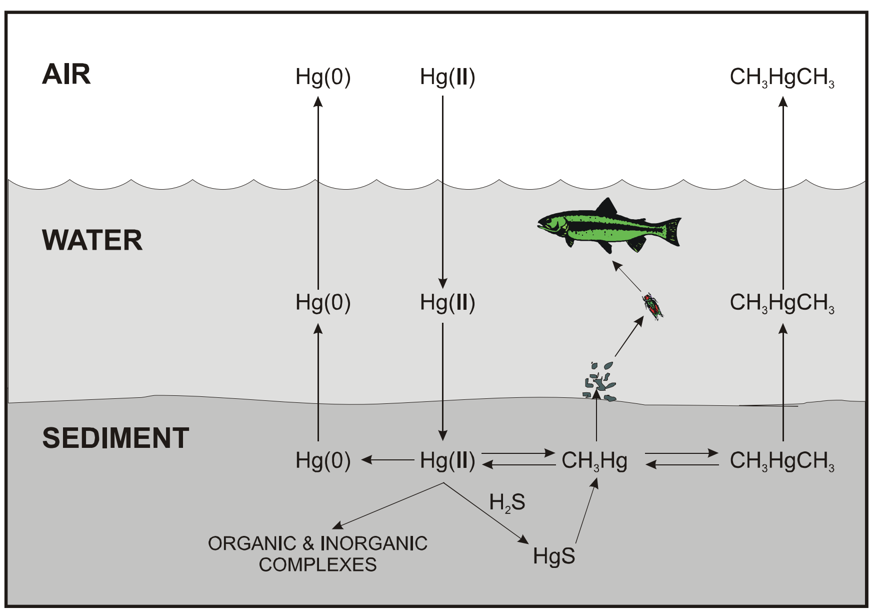

Figure 4.2. Pathways for mercury species through the aquatic ecosystem, including methylation and demethylation, evasion or loss from the water to the atmosphere, and sedimentation and burial in the sediment (after Winfrey and Rudd 1990).

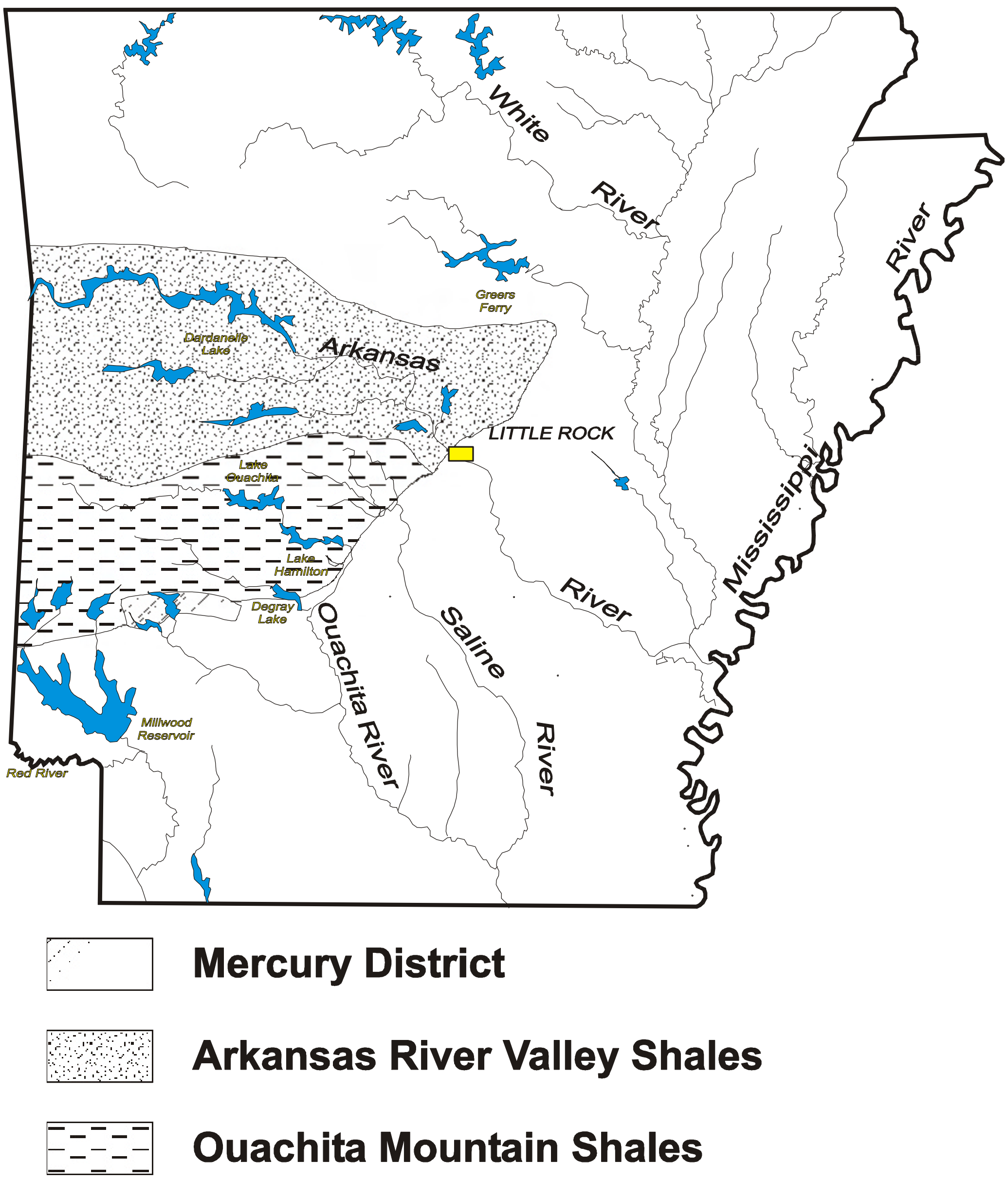

Figure 4.3. Shale formations and mercury district in Arkansas and relation to the Ouachita River basin from Armstrong et al. (1995).

Figure 4.4. Location of NADP monitoring stations LA10 Franklin Parish, LA and TX21 Gregg County, TX.

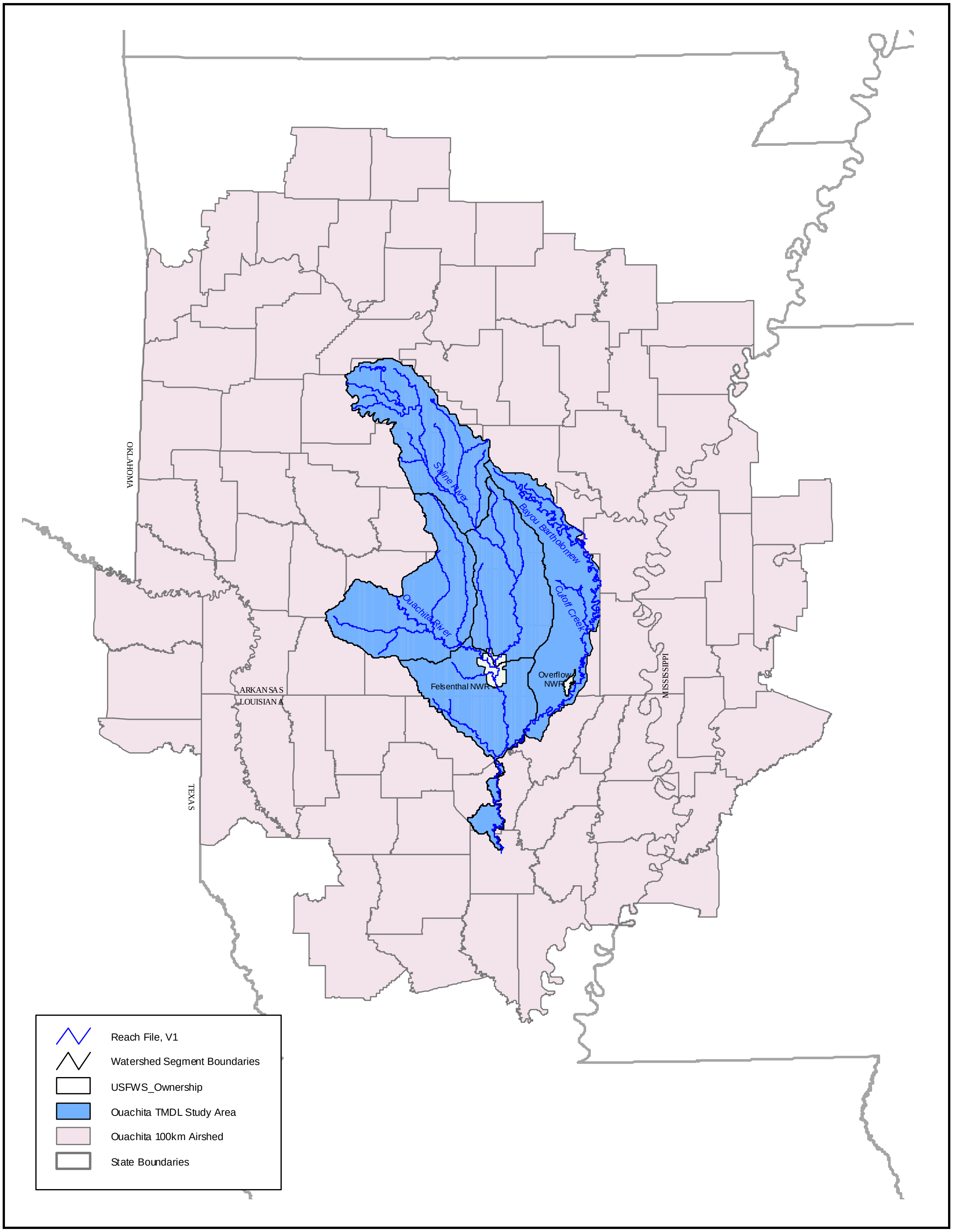

Figure 4.5. Airshed boundary for the Ouachita River basin watershed.

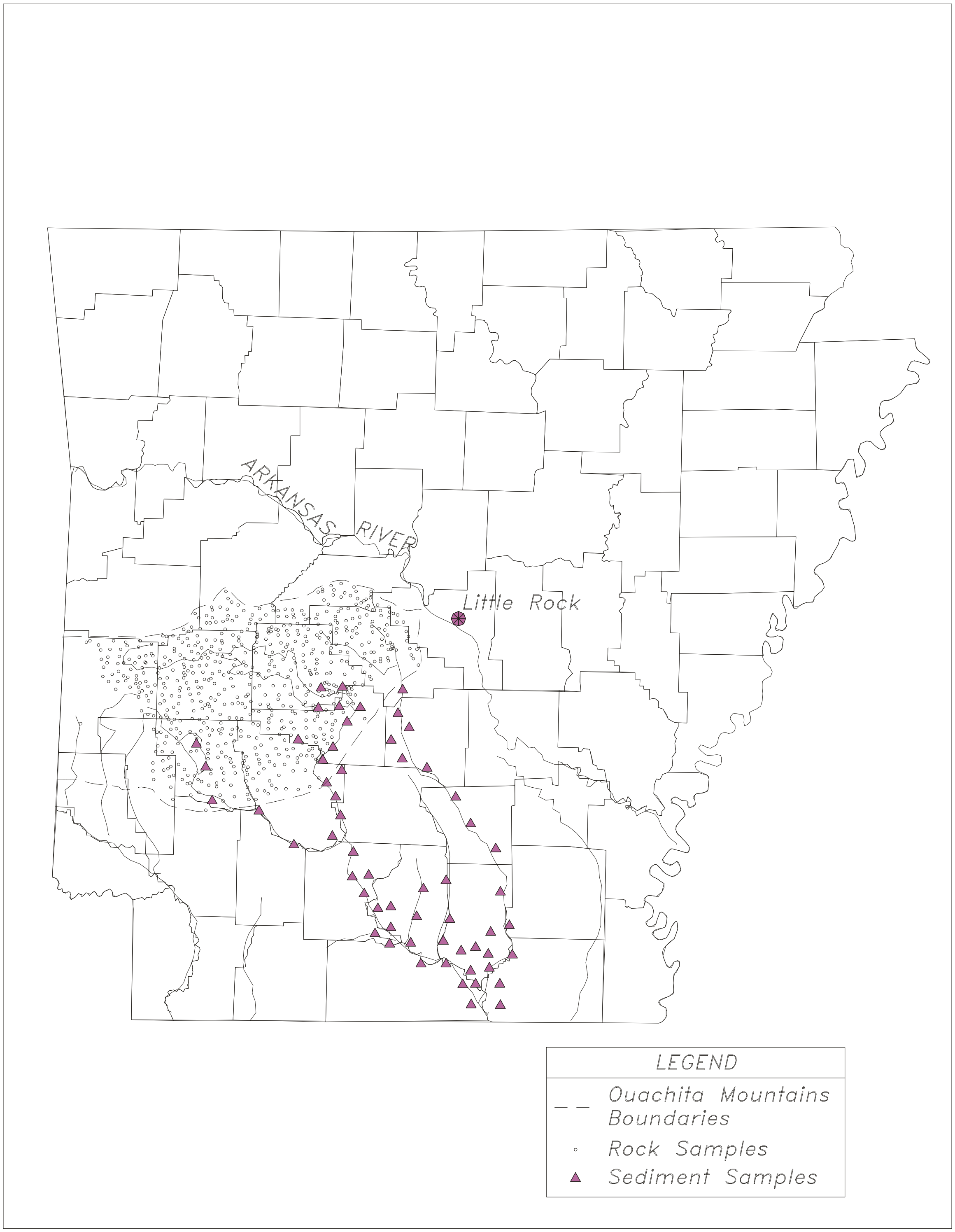

Figure 4.6. Sediment (triangle) and rock (dot) sampling locations for mercury analysis (Stone et al. 1995, Armstrong et al. 1995).

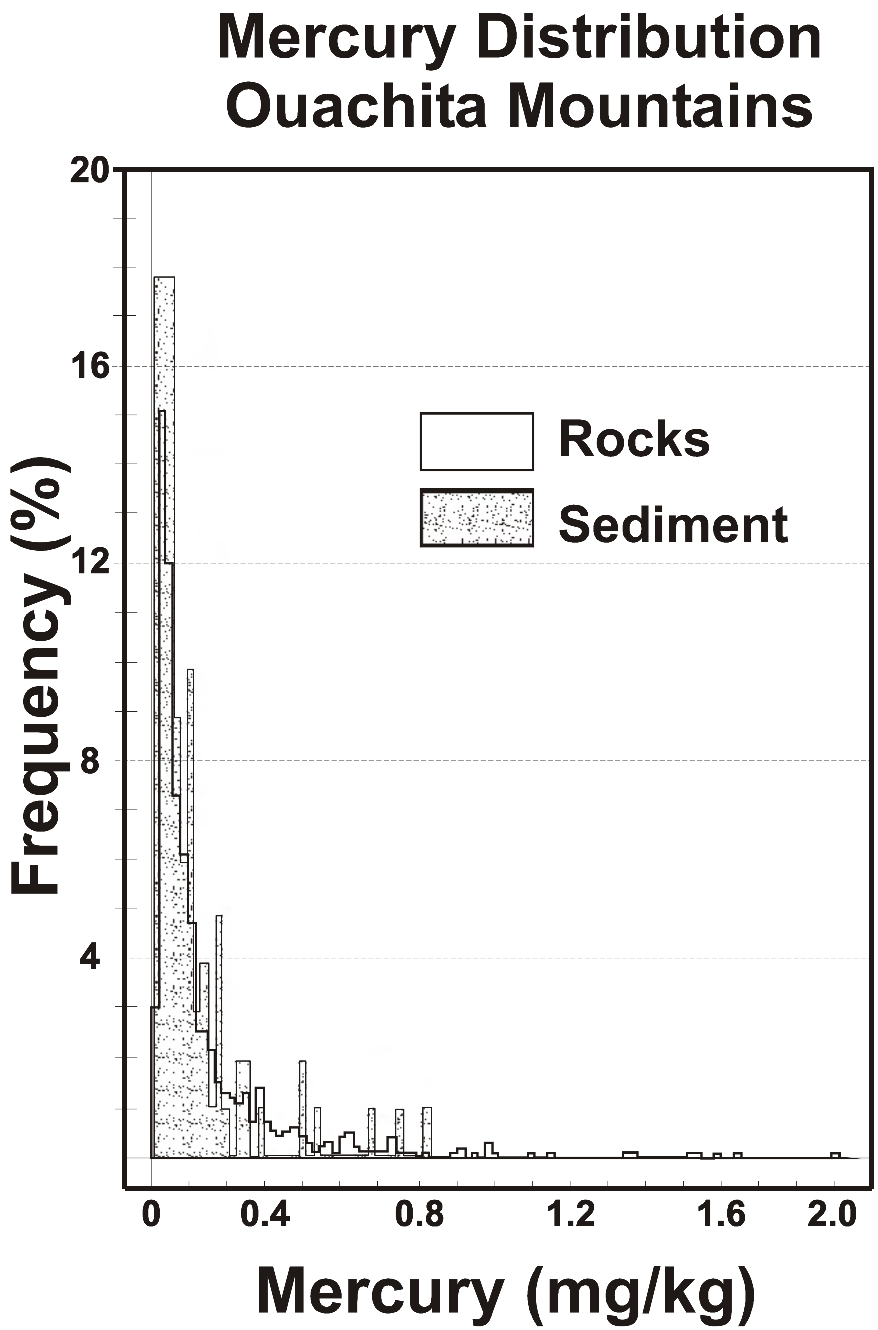

Figure 4.7. Distribution of mercury concentrations in sediment and rock samples from Stone et al. (1995).

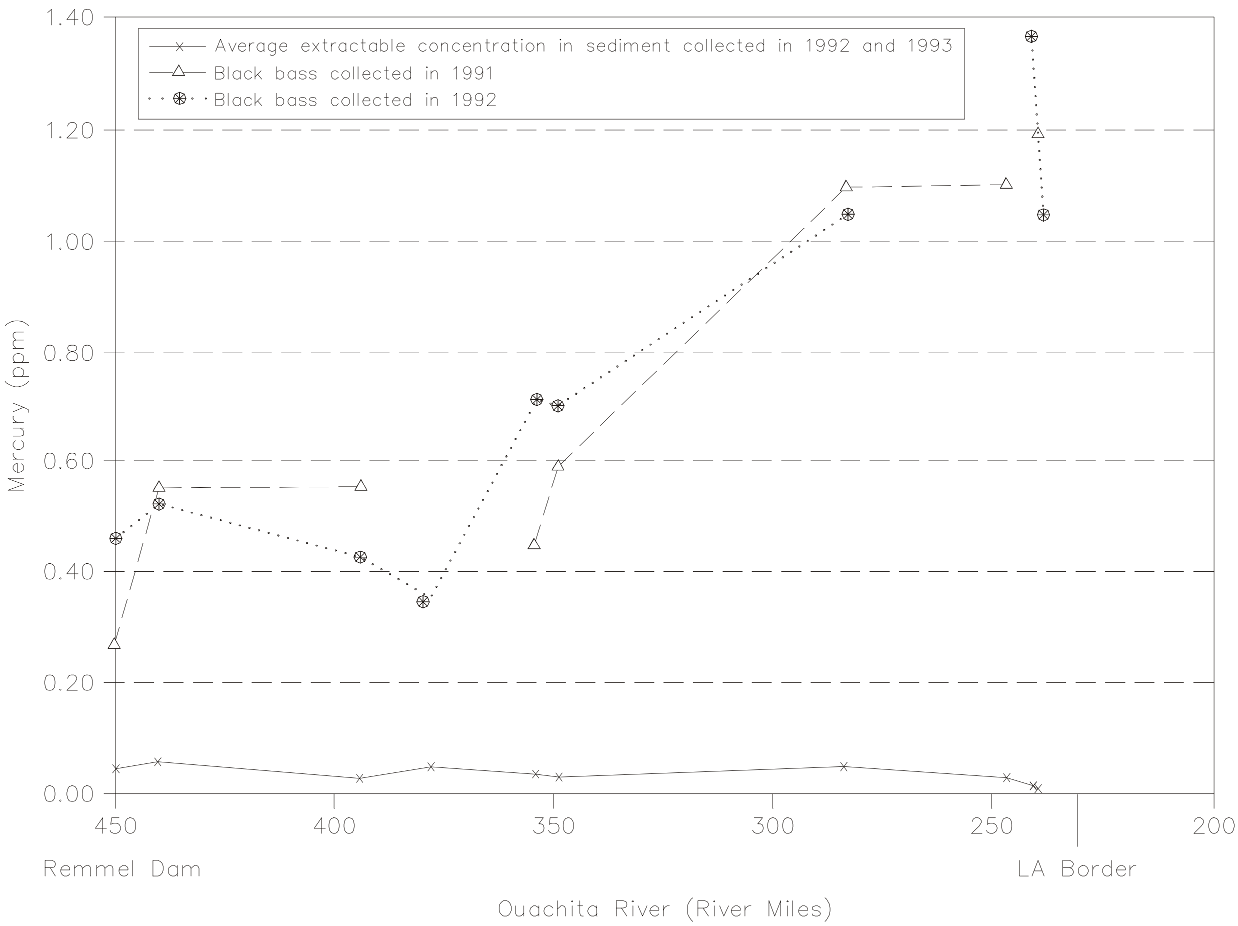

Figure 4.8. Average extractable Total Hg concentration in sediment along the Ouachita River. Largemouth bass Hg concentration increase from upstream to downstream (Armstrong et al. 1995).

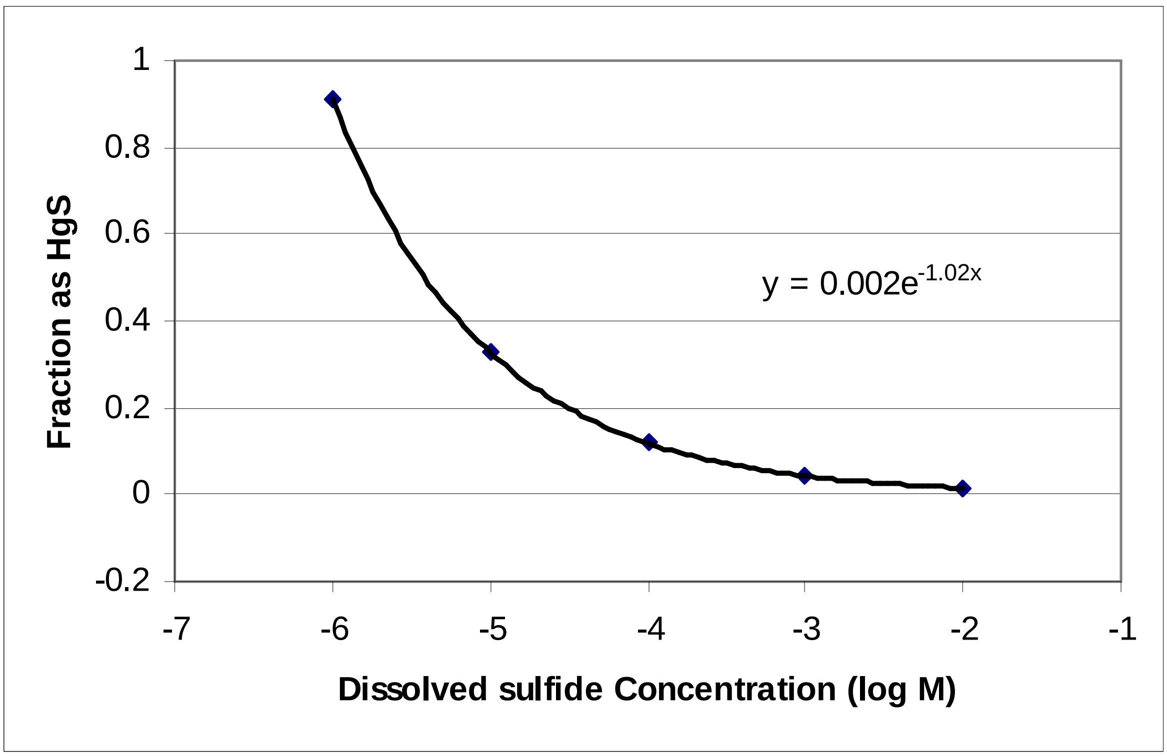

Figure 4.9. Relationship between neutral HgS concentration which is biologically available for methylation and the sulfide concentration in the water (after Benoit et al. 2000).

5.0 MARGIN OF SAFETY, SEASONAL VARIATIONS, AND CRITICAL CONDITIONS

5.1 Margin of Safety

An MOS accounts for any lack of knowledge or uncertainty concerning the relationship between load allocations and water quality. In this case, it accounts for uncertainty and variability related to fish tissue mercury concentrations, estimates of loading and the assumption of a linear relationship between fish tissue concentration and system load. These TMDLs incorporate MOS factored into the reduction factors, the wasteload allocations, and the load allocations through conservative assumptions. Use of safe target levels of 0.4 mg/kg and 0.8 mg/kg, for Louisiana and Arkansas respectively, results in an explicit MOS of 20% for both Louisiana and Arkansas TMDLs. In addition, implicit MOS is included because maximum fish tissue mercury concentrations were used for estimating reductions rather than fish tissue mercury concentration averaged for fish exceeding the Action Levels at each station. An advantage of using a regional approach is that waters which may be threatened by mercury (as opposed to impaired) are also protected.

5.2 Seasonal Variations and Critical Conditions

Wet deposition is greatest in the winter and spring seasons. Mercury loads fluctuate based on the amount and distribution of rainfall, and variability of localized and regional/global sources. While an average daily load is established here, the average annual load is of greatest significance because mercury bioaccumulates over the life of the fish and the resulting risk to human health from fish consumption is a long-term phenomenon. Thus, daily or weekly inputs are less meaningful than total annual loads over many years. The use of annual loads allows for integration of short-term and seasonal variability. Inputs should continue to be estimated through wet deposition and additional monitoring.

Mercury methylation is expected to be highest during the summer. High temperatures promote biological activity and lakes and reservoirs are stratified with anoxic hypolimnions. Based on the enhanced methylation and higher predator feeding rates during this period, mercury bioaccumulation is expected to be greatest during the summer. However, given the long depuration times for fish and relatively mild winters in southern Arkansas and northern Louisiana, seasonal changes in fish tissue mercury body burden are expected to relatively small. Inherent variability of mercury concentrations between individual fish of the same and/or different size categories is expected to be greater than seasonal variability.

Because of local geology, soils, natural vegetation, and topography, some areas of the Ouachita River and its tributaries are more susceptible to mercury methylation than others. For example, the steeper gradients in the upper portion of the Ouachita and Saline Rivers, without impoundments, results in generally lower fish tissue mercury concentrations. In the lower portion of the Ouachita and Saline Rivers and their tributaries, organic matter and sulfate concentrations are higher, and alkalinity and pH values are lower, which makes the systems more susceptible to mercury methylation. In addition, reservoirs have been created in the lower Ouachita River that also likely contribute to the increased mercury concentrations in fish. Felsenthal NWR is a relatively new reservoir and it has extensive wetland areas throughout the Refuge. Both of these factors contribute to mercury methylation. Felsenthal NWR should be managed as a special system for mercury bioaccumulation and fish consumption advisories.

6.0 REASONABLE ASSURANCE: ONGOING AND FUTURE REDUCTIONS IN EMISSIONS

Reasonable assurance is needed that water quality standards will be attained. Mechanisms to assess and control mercury loads, including strategies and regulatory controls, which would be national in scope, will aid implementation of TMDLs for specific basins. In addition, this TMDL will be reassessed periodically and may be modified to take into account available data and information, and the state of the science.

As rules and standards pursuant to the Clean Air Act have been developed, proposed, and promulgated since 1990, compliance by emitting sources as well as actions taken voluntarily have already begun to reduce emissions of mercury to the air across the US. EPA expects a combination of ongoing activities will continue to reduce mercury emissions to the air over the next decade. EPA currently regulates emissions of mercury and other HAPs under the MACT program of Section 112 of the Clean Air Act, and under a corresponding new source performance standard (NSPS) program under Sections 111 and 129 of the Act. Section 112 authorizes EPA to address categories of major sources of HAPs, including mercury, by issuing emissions standards that, for new sources, are at least as stringent as the emissions control achieved by the best performing similar source in the category, and, for existing sources, are at least as stringent as the average of the best performing top 12% (or 5 facilities, whichever is greater) of similar sources. EPA may also apply these standards to smaller area sources, or choose to apply less stringent standards based on generally available control technologies (GACT). Sections 111 and 129 direct EPA to establish MACT-equivalent standards for each category of new and existing solid waste incineration units, regulating several specified air pollutants, including mercury. In addition, in 1996 the US eliminated the use of mercury in most batteries under the Mercury Containing and Rechargeable Battery Management Act. This action is reducing the mercury content of the waste stream which is further reducing mercury emissions from waste combustion. In addition, voluntary measures to reduce use of mercury containing products, such as the voluntary measures committed to by the American Hospital Association, also will contribute to reduced emissions from waste combustion.

Based on the EPA's NTI, the highest emitters of mercury to the air include coal-burning electric utilities, municipal waste combustors, medical waste incinerators (MWIs), chlor-alkali plants, and hazardous waste combustors (HWCs). EPA has issued a number of regulations under Sections 112, 111, and 129 to reduce mercury pollution from several of these source categories. Relevant regulations that EPA has established to date under the Clean Air Act include, among others, those listed below.

- The source category of municipal waste combustion (MWC) emitted about 20% of total national mercury emissions into the air in 1990. EPA issued final regulations under Sections 111 and 129 for large MWCs on October 31, 1995. Large combustors or incinerators must comply with the rule by December 2000. These regulations reduce mercury emissions from these facilities by about 90% from 1990 emission levels.

- MWIs emitted about 24% of total national mercury emissions into the air in 1990. EPA issued emission standards under Sections 111 and 129 for MWIs on August 15, 1997. When fully implemented, in 2002, EPA's final rule will reduce mercury emissions from MWIs by about 94% from 1990 emission levels.

- HWCs emitted about 2.5% of total national mercury emissions in 1990. In February 1999, EPA issued emission standards under Section 112 for these facilities, which include incinerators, cement kilns, and light weight aggregate kilns that burn hazardous waste. When fully implemented, these standards will reduce mercury emissions from HWCs by more than 50% from 1990 emission levels.

These promulgated regulations, when fully implemented and considered together with the actions discussed above that will reduce the mercury content of waste, are expected to reduce national mercury emissions caused by human activities by about 50% from 1990 levels.

In February 2002 President Bush announced the Clear Skies Initiative. This initiative proposed to reduce mercury emissions from power plants (electric utilities) by 69%. An intermediate cap of 26 tons of mercury per year was proposed for 2010. Current mercury emissions from power plants are 48 tons per year.

EPA expects to propose a regulation under Section 112 that will limit mercury emissions from chlor-alkali plants, chlorine production facilities which use the mercury cell technology. In addition, under the Integrated Urban Air Toxics Strategy, which was published in 1999, EPA is developing emissions standards under Section 112 for categories of smaller sources of air toxics, including mercury, that pose the greatest risk to human health in urban areas. These standards are expected to be issued by 2004.

It is possible that the cumulative effect of additional standards and voluntary actions will reduce mercury emissions from human activities in the US by more than 50% from 1990 levels. However, whether the overall, total percent reduction in national mercury emissions in the future will exceed 50% cannot be estimated at this time. EPA will continue to track emissions of mercury and evaluate additional approaches to reduce releases of mercury into the environment.

A large portion of the mercury load comes from erosion of soils and geologic sources. Implementing best management practices (BMPs) in the watershed to reduce erosion would be expected to reduce the mercury load to the system. Reductions in atmospheric mercury will also reduce the accumulation of mercury in soils from atmospheric deposition. This will further reduce the mercury load to the system from soil erosion.

Because of the persistence of mercury in tissue, it could take decades for mercury levels in predatory fish to drop as a result of reductions in mercury loading to the system. In addition, geology or other characteristics (such as DO levels) may cause some sites (such as Felsenthal NWR) to react more slowly to reductions in mercury loading. Therefore, an adaptive management approach is recommended for the portion of the Ouachita River system included in this TMDL study. This approach would include public education on the potential effects and sources of mercury, implementation of BMPs, and management of fisheries based on local characteristics. The goal should be to move toward use attainment while protecting human health.

The environmental indicators with which to evaluate success will be monitoring of wet deposition rates at the LA10 site and fish tissue mercury concentrations in both states.

7.0 PUBLIC PARTICIPATION

When EPA establishes a TMDL, 40 CFR §130.7(d)(2) requires EPA to publicly notice and seek comment concerning the TMDL. This TMDL was prepared under contract to EPA. After completion of this draft TMDL, EPA will commence preparation of a notice seeking comments, information and data from the general and affected public. If comments, data, or information are submitted during the public comment period, then the TMDL may be revised accordingly. After considering public comment, information, and data, and making any appropriate revisions, EPA will transmit the revised TMDL to the Arkansas Department of Environmental Quality, and to the Louisiana Department of Environmental Quality for incorporation into the ADEQ and LDEQ current water quality management plans.

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APPENDIX A

NPDES Permit Facilities

Table A1. Continued.

Pcs Permit Facility Npdes	Pcs Permit Facility City Name	Pcs Permit Facility County Name	Pcs Permit Facility Final Limits Ind	Pcs Permit Facility Flow Rate (MGD)	Pcs Permit Facility Loc Name	Pcs Permit Facility Major Discharge Indicator	Pcs Permit Facility Original Permit Issue Date	Pcs Permit Facility Permit Expired Date	Pcs Permit Facility Permit Issued Date	Pcs Permit Facility Receiving Waters	Pcs Permit Facility River Basin	Pcs Permit Facility Stream Segment	Pcs Permit Facility Usgs Hydro Basin Code
AR0000558	Camden	Ouachita	F	8.5	International Paper Co.-Camden	M	10/7/74	1/31/02	12/31/96	Ouachita Rv (001) & W Two Bu (002)	101700		8040201
AR0000574	El Dorado	Union		0.18	Cooper Tire & Rubber Co		6/28/74	12/31/00	11/30/95	Dit Boggy Ck Bu De Loutre	101700	80	8040202
AR0000582	Bauxite	Saline	F	10.8	Aluminum Company Of America	M	10/31/74	5/31/95	4/25/90	Hurricane Ck Holly Ck Dry Lost Ck	101700	60	8040203
AR0000591	Smackover	Union		0.65	Cross Oil Refining & Marketing	M	10/7/74	11/30/04	10/31/99	Smackover Ck (1-3) & Holmes Ck (4)	101700		8040201
AR0000647	El Dorado	Union		2.73	Lion Oil Co-El Dorado Refinery	M	11/2/74	9/30/03	8/31/98	Loutre Ck Bu Deloutre Ouachita Rv	101700		8040202
AR0000663	Stephens	Ouachita	F	0.15	Berry Petroleum Co-Stephens	M	10/28/74	11/30/02	10/31/97	Trib Smackover Ck Ouachita Rv	101700		8040201
AR0000680	El Dorado	Union	F	1.19	Great Lakes Chemical Corp.		3/12/75	4/30/02	4/30/97	Gum Ck-2d (1) & Walker Ck-2e (2 3)	101700		8040201
AR0000752	El Dorado	Union	F	2.431	El Dorado Chemical Co. Inc.	M	10/22/74	1/31/95	12/29/89	Trib Flat Ck Haynes Ck Ouachita Rv	101700	70	8040202
AR0000841	Camden	Ouachita	F	100.8	Aecc-Mcclellan Generating Stat		3/8/75	6/30/05	6/30/00	Quachita Rv	101700		8040201
AR0000876	Warren	Bradley	F	1.49	Potlatch Corp-Bradley Unit		1/10/74	12/31/04	11/30/99	Trib Saline Rv (1 2) & Brushy Fk(3)	101700		8040204
AR0000914	Warren	Bradley	F	0.38	Potlatch Corp-Southern Unit		3/22/74	12/31/04	12/31/99	Franklin Ck Saline Rv Ouachita Rv	101700		8040204
AR0001112	Bauxite	Saline	F	0.01	Reynolds Metals Co-Hurricane	M	10/12/74	8/31/00	8/31/95	Trib Hurricane Ck	101700	60	8040203
AR0001171	El Dorado	Union		6.55	Great Lakes Chemical Corp.	M	1/25/75	4/30/03	3/31/98	Bu De Loutre (1 2 4) & Lt Cornie Bu	101700		8040202
AR0001210	Crossett	Ashley	F	65	Georgia Pacific-Crossett	M	11/2/74	10/31/91	10/31/86	Coffee Ck Ouachita Rv	101700	30	8040202
AR0001236	Malvern	Hot Spring	F	0.62	Borden Chemical Inc.	M	1/10/74	2/28/01	1/31/96	Big Ck Francis Ck Saline Rv	101700		8040203
AR0020168	Stephens	Ouachita	F	0.2	Stephens City Of		9/6/74	9/30/04	9/30/99	Smackover Ck Ouachita Rv	101700		8040201
AR0021440	Smackover	Union	F	0.5	Smackover City Of		12/12/74	3/31/03	3/31/98	Smackover Ck Ouachita Rv	101700	60	8040201
AR0021474	Bearden	Ouachita	F	0.346	Bearden City Of		11/28/74	9/30/04	9/30/99	Two Bayou Ck Ouachita Rv	101700		8040201
AR0021687	Strong	Union	F	0.3	Strong City Of		12/12/74	3/31/03	3/31/98	Lapile Ck Ouachita Rv	101700	50	8040202
AR0021695	Rison	Cleveland	F	0.31	Rison City Of		12/12/74	5/31/04	5/31/99	Trib Harrison Ck Saline Rv	101700		8040204
AR0021822	Monticello	Drew	F	1	Monticello City Of-West Plant	M	11/28/74	9/30/04	9/30/99	10-Mile Ck Saline Rv Ouachita Rv	101700		8040204
AR0021831	Monticello	Drew	F	2.5	City of Monticello East Plant	M	10/28/74	6/30/06	6/30/01	Godfrey Ck	101700		8020405
AR0021873	Hampton	Calhoun	F	0.3	Hampton City Of		11/19/74	12/31/03	12/31/98	Champagnolle Ck	101700	30	8040201
AR0022144	Wilmot	Ashley	F	0.165	City of Wilmot WWTF		9/21/74	1/31/03	1/31/98	Bayou Bartholomew	101700	20	8020405
AR0022268	Huttig	Union	F	0.138	Huttig City Of		10/21/74	12/31/04	12/31/99	Ouachita Rv	101700		8040202
AR0022365	Camden	Ouachita	F	3.2	Camden Water Utilities	M	7/2/76	4/30/02	4/30/97	W Two Bu (1) & Ouachita Rv (2)	101700		8040201
AR0033715	Carthage	Dallas	F	0.09	Carthage City Of		10/31/86	12/31/02	12/31/97	Trib Moro Ck	101700		8040201
AR0033723	El Dorado	Union	F	7	El Dorado City Of-South Wwtp	M	5/30/74	3/31/02	3/31/97	Bu De Loutre	101700		8040202
AR0033758	Fordyce	Dallas	F	0.84	Fordyce City Of		4/30/74	11/30/00	11/30/95	Jug Ck Moro Ck Ouachita Rv	101700		8040201
AR0033812	Ashley County	Ashley	F	0.45	North Crossett Utilities		11/12/74	9/30/04	9/30/99	Ltl Brushy Ck Big Brushy Ck	101700		8040202
AR0033936	El Dorado	Union	F	5	El Dorado City Of-North Wwtp	M	5/30/74	10/31/02	9/30/97	Mill Ck Haynes Ck Smackover Ck Ouac	101700	60	8040201
AR0034002	Bryant	Saline		1	Bryant City Of	M	11/12/74	4/30/03	3/31/98	Trib Hurricane Ck Saline Rv Ouachit	101700	60	8040203
AR0034029	Hamburg	Ashley	F	0.94	City of Hamburg		10/21/74	9/30/04	9/30/99	Chemin-a-Haut Ck	101700	11	8020405
AR0034291	Hot Springs Village	Garland	F	1	Hot Springs Village Poa		2/5/76	11/30/03	11/30/98	Mill Ck Middle Fk Alum Fk Saline Rv	101700		8040203
AR0034347	Sheridan	Grant	F	0.676	Sheridan City Of-South Wwtp		11/5/74	11/30/04	10/31/99	Big Ck Hurricane Ck Saline Rv	101700	40	8040203
AR0034363	East Camden	Calhoun		1.5	Shumaker Public Service Corp.		12/16/74	4/30/03	3/31/98	Two Bu Ck	101700		8040201

Table A1. Continued.

Pcs Permit Facility Npdes	Pcs Permit Facility City Name	Pcs Permit Facility County Name	Pcs Permit Facility Final Limits Ind	Pcs Permit Facility Flow Rate (MGD)	Pcs Permit Facility Loc Name	Pcs Permit Facility Major Discharge Indicator	Pcs Permit Facility Original Permit Issue Date	Pcs Permit Facility Permit Expired Date	Pcs Permit Facility Permit Issued Date	Pcs Permit Facility Receiving Waters	Pcs Permit Facility River Basin	Pcs Permit Facility Stream Segment	Pcs Permit Facility Usgs Hydro Basin Code
AR0035653	Norphlet	Union	F	0.18	Norphlet City Of		2/21/75	5/31/05	5/31/00	Trib/Flat Ck Hayner Ck Smackover Ck	101700		8040201
AR0035661	Thornton	Calhoun	F	0.05	Thornton City Of		2/21/75	12/31/01	12/31/96	Turners Ck Champagnolle Ck Ouachita	101700	30	8040201
AR0035955	Benton	Saline	F	0.02	Bryant Pub School-Salem Elemen		2/5/76	4/30/01	4/30/96	Trib Hurricane Ck	101700		8040203
AR0036064	Fordyce	Dallas	F	0.357	Georgia Pacific-Fordyce		7/11/77	6/30/03	6/30/98	Jug Ck Moro Ck	101700	10	8040201
AR0036072	El Dorado	Union			Georgia Pacific-Eldorado		3/7/77	1/31/01	1/31/96	Trib Bu De Loutre	101700	80	8040202
AR0036358	Haskell	Saline	F	0.005	Wabash Alloys Llc		1/19/76	1/31/05	1/31/00	Dodson Ck Trib	101700		8040203
AR0036498	Benton	Saline	F	6.6	Benton City Of-Wwtp	M	1/16/76	2/28/03	1/31/98	Trib Depot Ck Saline Rv	101700		8040203
AR0037141	Parkdale	Ashley	F	0.05	City of Parkdale WWTF		10/31/86	4/30/03	4/30/98	Bayou Bartholomew	101700	20	8020405
AR0037559	Benton	Saline	F	0.02	Cedar Hill Investments-Oak For		7/31/78	1/31/02	1/31/97	Hurricane Ck Trib	101700	60	8040203
AR0037761	Louann	Ouachita	F	0.03	Beech Springs Baptist Camp		10/24/79	7/31/00	7/31/95	Ouachita Rv Trib	101700		8040201
AR0037800	El Dorado Twp	Union		1.29	Ensco Inc	M	3/19/81	5/31/04	4/30/99	Boggy Ck	101700		8040202
AR0037885	Jefferson County	Jefferson	F	0.025	Boggy Bayou SID		11/27/91	12/31/01	12/31/96	Boggy Bayou Bayou Bartholomew	101000		8020405
AR0038211	Calion	Union	F	0.112	Calion City Of		6/8/82	5/31/02	5/31/97	Chapelle Slu Ouachita Rv & Rb	101700	20	8040201
AR0038989	Hermitage	Bradley	F	0.07	Hermitage City Of-Stp		4/25/84	7/31/03	7/31/98	Big Town Ck L'aigle Ck Saline Rv	101700		8040204
AR0039144	Jefferson County	Jefferson	F	0.05	Pinewood SID #1		2/28/92	3/31/02	3/31/97	Trib Nevins Ck	101000		8020405
AR0039284	Hot Springs Village	Garland		0.5	Hot Springs Village-Cedar Ck		10/31/88	11/30/04	11/30/99	Cedar Ck South Fork Saline Rv	101700		8040203
AR0039659	Felsenthal	Union	F	0.049	Felsenthal Town Of		6/29/83	4/30/04	4/30/99	Wolf Slough	101700		8040202
AR0040096	Wilmar	Drew	F	0.12	Wilmar City Of		5/15/84	3/31/05	3/31/00	Flat Branch Ck Ten Mile Ck	101700		8040204
AR0040517	Louann	Ouachita	F	0.064	Loann City Of		8/2/84	3/31/01	3/31/96	Brushy Ck Smackover Ck Ouachita Rv	101700		8040201
AR0041297	Montrose	Ashley	F	0.1	City of Montrose WWTF		10/18/85	6/30/06	6/30/01	Wards Bayou (2A) & Bayou Bartholomew (2B)	101700		8020405
AR0041416	Benton	Saline	F	0.012	Timber Ridge Neurorehab Center		5/29/87	11/30/02	11/30/97	Henderson Ck N Fk/Saline Rv	101700		8040203
AR0041602	Pine Bluff	Jefferson	F	0.012	Suburbia SID #1-Jefferson Cnty		10/31/86	9/30/03	9/30/98	Nevin Ck Bayou Bartholomew	101700		8020405
AR0042129	Bryant	Saline					9/30/86	9/30/91	9/30/86		101700		8040203
AR0042277	Benton	Saline	F	0.004	Pawnee Village Poa		3/30/87	9/30/02	9/30/97	Trace Ck Trib Saline Rv	101700		8040203
AR0042315	Crossett	Ashley	F	0.013	Crossett Harbor Port Authority		3/30/87	11/30/02	11/30/97	Ouachita Rv	101700		8040202
AR0042421	Fountain Hill	Ashley	F	0.055	Fountain Hill City Of-Wwtp		3/30/87	8/31/02	8/31/97	Flat Ck Trib Saline Rv	101700	2	8040204
AR0042609	Harrell	Calhoun	F	0.072	Harrell City Of		7/31/87	10/31/02	10/31/97	Spring Br Blann Ck Lloyd Ck Moro Ck	101700		8040201
AR0042889	Benton	Saline	F	0.01	J.J.'S Truck Stop Inc		1/29/88	2/28/03	2/28/98	Brushy Ck Trib Francois Ck Saline R	101000		8040203
AR0043257	Leola	Grant	F	0.3	Farm Fresh Catfish Company		6/28/89	11/30/04	11/30/99	Trib Saline Rv	101700		8040203
AR0043427	Warren	Bradley	F	2	Warren City Of-Stp	M	2/23/89	1/31/03	1/31/98	Saline Rv	101700		8040204
AR0043672	Kingsland	Cleveland	F	0.06	Kingsland City Of		1/30/90	1/31/05	1/31/00	Panther Ck Saline Rv Ouachita Rv	101700		8040204
AR0044075	Hot Springs	Garland	F	0.025	Fountain Lake School Dist 18		11/30/89	9/30/04	9/30/99	Trib/S Frk/Saline Rv	101700		8040203
AR0044105	Malvern	Hot Spring	F	0.362	Willamette Industries-Malvern		3/29/91	4/30/96	3/29/91	Trib Big Ck Saline Rv	101700		8040203
AR0044156	Benton	Saline	F	0.013	Alcoa Road Mobile Home Park		5/23/89	8/31/04	8/31/99	Trib Hurricane Ck	101700		8040203
AR0044423	Jessieville	Garland	F	0.018	Jessieville Public School		3/29/89	7/31/04	7/31/99	Trib Coleman Ck Saline Rv	101700		8040203
AR0044431	Ashley County	Ashley	F	0.011	Jordan Town Mhp		11/30/89	7/31/04	7/31/99	Trib Bell Branch	101700		8040202
AR0044482	Benton	Saline	F	0.01	Branch Hollow Mobile Home Park		1/31/91	2/28/01	2/29/96	Hurricane Ck	101700		8040203
AR0044652	Benton	Saline		0.033	Hurricane Lake Mhp		8/30/89	9/30/04	8/31/99	Hurricane Ck Saline Rv	101700		8040203

Table A1. Continued.

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AR0044733	El Dorado	Union	F	0.031	Wildwood Trailer Park		2/27/90	6/30/00	6/30/95	Trib Flat Ck Haynes Ck Smackover Ck	101700		8040201
AR0045047	Hot Springs	Garland	F	0.01	Village Square Shopping Center		8/30/90	4/30/01	4/30/96	Trib Mill Ck Saline Rv	101700		8040203
AR0045233	East Camden	Calhoun	F	0.003	Lockheed Martin Missiles &Fire		4/25/90	6/30/00	6/30/95	Trib Locust Bu	101700		8040201
AR0045659	Smackover	Union	F	0.0053	Welsco Inc		8/30/91	11/30/01	10/31/96	Dit Holmes Ck	101700		8040201
AR0045888	Star City	Lincoln	F	0.01	AR Parks & Tourism - Cane Creek		1/31/92	3/31/02	3/31/97	Cane Ck	101700		8020405
AR0045926	Camden	Ouachita	F		International Paper-Cullendale		8/31/92	6/30/04	5/31/99	Trib Two Bu	101700		8040202
AR0046116	Huttig	Union		0.039	Plum Creek Manufacturing L.P.		4/30/92	12/31/04	12/31/99	Dollar Slu (1 2); Buckhorn Slu (4)	101700		8040202
AR0046141	Mountain Valley	Garland	F	0.025	Mountain Valley Retreat Center		12/31/91	1/31/02	1/31/97	Trib S Fk Saline Rv	101700		8040203
AR0046451	Fordyce	Dallas	F	0.022	Anthony Timberlands Inc-Fordyc		9/30/92	1/31/04	1/31/99	Dit Jug Ck	101700		8040201
AR0046477	Star City	Lincoln	F	0.375	City of Start City MWTF		8/31/93	11/30/03	11/30/98	Cane Ck Bayou Bartholomew	101700		8020405
AR0046698	Leola	Grant		0.036	International Paper Co-Leola		7/31/94	9/30/02	8/31/97	Trib Saline Rv	101700		8040203
AR0046817	Malvern	Hot Spring	F	0.024	Glen Rose Public School		3/31/93	11/30/03	11/30/98	Trib 10-Mile Ck	101700		8040203
AR0047210	Bryant	Saline	F	0.025	Salem Sewer Improvement Dist10		9/30/95	9/30/00	9/30/95	Trib Hurricane Ck Saline Rv	101700		8040203
AR0047350	Monticello	Drew	F	0.0075	Pine Haven Mobile Lodge		7/31/94	8/31/04	8/31/99	Godfrey Ck trib Cutoff Ck Bayou Bartholomew	101700		8020405
AR0047368	El Dorado	Union	F	2.4	Columbian Chemical Company		7/31/95	7/31/00	7/31/95	Trib Boggy Ck	101700		8040201
AR0047384	Urbana	Union	F	0.156	Anthony Forest Products Co.		3/31/94	4/30/99	3/31/94	Cattail Marsh N Lapile Ck	101700		8040202
AR0047431	Benton	Saline	F	0.033	Pathway Campground-Ark Church		2/28/94	3/31/04	3/31/99	Trib Brushy Ck Saline Rv Ouachita R	101700		8040203
AR0047503	Carthage	Dallas		0.01	Idaho Timber Corp. Of Carthage		11/30/94	12/31/04	12/31/99	Trib Moro Ck Ouachita Rv	101700		8040201
AR0047732	Monticello	Drew	F		J.P. Price Lumber Company		1/31/95	11/30/04	11/30/99	Trib Clear Ck Saline Rv	101700		8040204
AR0047767	Warren	Bradley	F	0.001	Robbins Sykes Flooring		6/30/95	7/31/00	6/30/95	Saline Rv Trib	101700		8040204
AR0047830	Hermitage	Bradley	F		Johnsville Sand & Gravel		5/31/95	5/31/05	5/31/00	Hunt Br Saline Rv	101700		8040204
AR0047872	Star City	Lincoln	F	0.0255	Robert Floyd Sawmill Inc.		3/31/95	1/31/05	1/31/00	Trib, Cane Ck, Bayou Bartholomew	101700		8020405
AR0047902	Leola	Grant		0.03	H.G. Toler & Son Lumber Co.		3/31/95	3/31/00	3/31/95	Trib Saline Rv	101700		8040203
AR0048003	Bauxite	Saline	F	0.001	Alumina & Ceramic Lab-Malakoff		8/31/95	8/31/00	8/31/95	Dit Hurricane Ck Saline Rv	101700		8040203
AR0048046	Camden	Ouachita	F	3.2253	Rogers Lumber Co. Of Camden		8/31/95	8/31/00	8/31/95	Ouachita Rv Trib	101700		8040201
AR0048097	Crossett	Ashley			Georgia Pacific-North Log Yard		3/31/96	3/31/01	3/31/96	Trib Ltl Brushy Ck Big Brushy Ck	101700		8040202
AR0048135	Bauxite	Saline	F	0.025	Bauxite Public School Dist #14		2/29/96	2/28/01	2/29/96	Trib Holly Ck Saline Rv	101700		8040203
AR0048194	Jessieville	Garland	F	0.01	North Garland Co. Youth Center		4/30/96	4/30/01	4/30/96	Trib Coleman Ck Mid Fk Saline Rv	101700		8040203
AR0048259	Bauxite	Saline	F	0.012	Bauxite School Dist 14-Plant 2		2/29/96	2/28/01	2/29/96	Hurricane Ck Trib Saline Rv	101700		8040203
AR0048381	Mount Holly	Union		2	Watson Tie Mill & Logging Inc		10/31/96	10/31/01	10/31/96	Beech Ck Smackover Ck Ouachita Rv	101700		8040201
AR0048445	Poyen	Grant	F	0.055	Poyen City Of-Mstp		3/31/99	3/31/04	3/31/99	Trib Big Ck Francois Ck Saline Rv	101700		8040203
AR0048569	Rison	Cleveland	F	0.004	Woodlawn Sch00l District #6		10/31/97	10/31/02	10/31/97	Trib Hudgin Ck Saline Rv	101700		8040204
AR0049018	Benton	Saline		0.56	Benton City Of-Hurricane Lake					Hurricane Ck Saline Rv	101700		8040203
AR0049123	Mount Holly	Union	F	0.005	Mt Holly School Wastewater Sys		4/30/00	4/30/05	4/30/00	Trib Dry Ck Beech Ck Smackover Ck	101700		8040201

Table A1. Continued.

Pcs Permit Facility Npdes	Pcs Permit Facility City Name	Pcs Permit Facility County Name	Pcs Permit Facility Final Limits Ind	Pcs Permit Facility Flow Rate (MGD)	Pcs Permit Facility Loc Name	Pcs Permit Facility Major Discharge Indicator	Pcs Permit Facility Original Permit Issue Date	Pcs Permit Facility Permit Expired Date	Pcs Permit Facility Permit Issued Date	Pcs Permit Facility Receiving Waters	Pcs Permit Facility River Basin	Pcs Permit Facility Stream Segment	Pcs Permit Facility Usgs Hydro Basin Code
AR0049140	El Dorado	Union	F	4.9	Union Generating Station		4/30/00	4/30/05	4/30/00	Ouachita Rv	101700		8040202
ARG160026	El Dorado	Union	F	0.065	Waste Mgt Of Ar Inc-Union Co		9/26/89	8/31/04	7/31/99	Trib Smackover Ck	101700		8040202
ARG160027	Hamburg	Ashley	F	0.15	Ashley County Landfill		7/31/99	8/31/04	7/31/99	Trib Hanks Ck	101700		8020405
ARG340050	El Dorado	Union	F		Central Oil & Supply Corp		10/31/94	3/31/05	2/29/00	Dit	101700		8040202
ARG550200	Strong	Union	F	0.0001	Ebenezer Baptist Church		4/1/91	4/30/03	4/30/98	Trib Lapile Ck	101700		8040202
ARG550203	East Camden	Ouachita	F	0.0016	Day & Zimmerman		4/1/91	4/30/03	4/30/98	Dit Locust Bu	101700		8040201
ARG550215	Benton	Saline	F		American Freightways-Cargo		4/1/91	4/30/03	4/30/98	Hurricane Lk Trib	101700		8040203
ARG640110	Pinebergen	Jefferson	F		Hwy 15 Water Users Association		8/18/93	10/31/04	9/30/99	Bayou Bartholomew	101700		8020405
ARG640117	Cleveland County	Cleveland	F	0.425	Hwy 15 Water Users Association		3/31/94	10/31/04	9/30/99	Hudgins Ck	101700		8040204
ARG640121	Sheridan	Grant	F	0.9	S Sheridan-L Creek Waterworks		3/31/94	10/31/04	9/30/99	Trib Hurricane Ck	101700		8040203
ARG640143	Fountain Hill	Ashley	F	0.0018	City of Fountain Hill PWTP		9/30/99	10/31/04	9/30/99	Fountain Ck	101700		8020405
ARG750069	El Dorado	Union	F	0.15	Get-Rid-Of-It Of Ar		5/31/94	7/31/04	7/31/99	Flat Ck	101700		8040201
ARG750074	Pine Bluff	Jefferson	F	0.0002	Rasmussen Group Inc		7/31/99	7/31/04	7/31/99	Dit Lk Lanhhofer Arkansas Rv	101000		8040203
ARG790034	Pine Bluff	Jefferson	F	0.036	Mapco Petroleum #3020		1/31/95	1/31/06	1/31/01	storm swr dit Bayou Bartholomew 3C	101000		8020405
ARG790056	Wilmot	Ashley	F	0.017	E-Z Mart Store #348		1/31/95	1/31/06	1/31/01	Lk Enterprise	101700		8020405
LA0007579	Sterlington	Ouachita	F		Entergy Louisiana Inc	M	4/12/75	10/31/97	6/30/92	Ouachita	101700		8040202
LA0007854	Sterlington	Ouachita	F		Angus Chem Co	M	12/28/74	10/31/99	9/30/94	Seg 080101 Ouachita River Basin	101700		8040202
LA0043656	Marion	Union		0.26			2/11/75	12/9/93	12/9/88	Big Creek	101700	20	8040202
LA0046809	Sterlington	Ouachita		0.15			10/30/75	6/30/99	6/27/94	Seg 080101 Ouachita River Basin	101700	20	8040202
LA0070017	Bastrop	Morehouse			Texas Gas Transm Corp					Chemin-a-Haut Bayou Bartholomew	101700		8020405
LA0091723	Bastrop	Morehouse			International Paper-Yard #204		8/25/98	8/31/03	8/25/98	Cypress Bayou	101700		8040205
LA0100811	Union	Saint James			Conagra Poultry - Farmerville					Hunnicutt Creek	102100		8040202
LA0102318	Bastrop	Morehouse			Geo Specialty Chem		4/18/97	4/17/02	4/18/97	Little Bayou Boeuf Wham Brake Bayou Lafourche	101700		8020405

APPENDIX B

Local Mercury Emission Sources

EPA Region	State	County	Urban/Rural	MACT Category	Number of Point Sources	Point Source Emissions (lbs/year)	Non-Point Source Emissions (lbs/year)	Total Emissions (lbs/year)
6	AR	Arkansas	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	4.33E-01	9.24E-02	5.25E-01
6	AR	Ashley	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	2	5.27E+00	1.46E-01	5.42E+00
6	AR	Bradley	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	8.64E-01	3.74E-02	9.02E-01
6	AR	Calhoun	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.05E-02	1.05E-02
6	AR	Chicot	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	3.01E-02	3.01E-02
6	AR	Clark	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	8.63E-01	4.49E-01	1.31E+00
6	AR	Cleburne	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	4.36E-02	4.36E-02
6	AR	Cleveland	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	7.60E-03	7.60E-03
6	AR	Columbia	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	4.15E-01	1.07E-01	5.22E-01
6	AR	Conway	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	1.91E+00	6.05E-02	1.97E+00
6	AR	Dallas	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	2	1.84E+00	4.90E-01	2.33E+00
6	AR	Desha	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	4.81E-02	4.81E-02
6	AR	Drew	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	9.50E-02	9.50E-02
6	AR	Faulkner	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	2.36E-01	2.36E-01
6	AR	Franklin	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	4.37E-02	4.37E-02
6	AR	Garland	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	3.79E-01	1.20E-01	4.99E-01
6	AR	Grant	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	4.51E-01	8.62E+00	9.07E+00
6	AR	Hempstead	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	1.03E-01	1.10E-01	2.13E-01
6	AR	Hot Spring	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	2	1.65E+00	6.69E-02	1.71E+00
6	AR	Howard	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	8.91E-01	1.54E-01	1.05E+00
6	AR	Jefferson	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	2	1.08E+00	2.44E-01	1.33E+00
6	AR	Johnson	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	9.55E-02	9.55E-02
6	AR	Lafayette	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	8.33E-02	8.33E-02
6	AR	Lee	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.31E-02	1.31E-02
6	AR	Lincoln	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	2.74E-02	2.74E-02
6	AR	Little River	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	2	1.14E+01	5.05E-02	1.14E+01
6	AR	Logan	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	8.02E-02	8.02E-02
6	AR	Lonoke	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	6.61E-02	6.61E-02
6	AR	Miller	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	7.44E-02	7.44E-02
6	AR	Monroe	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.63E-02	1.63E-02
6	AR	Montgomery	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.07E-02	1.07E-02
6	AR	Nevada	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	4.52E-01	4.52E-01
6	AR	Newton	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	5.58E-03	5.58E-03
6	AR	Ouachita	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	2	2.45E+00	1.04E-01	2.56E+00
6	AR	Perry	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	6.12E-03	6.12E-03
6	AR	Phillips	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	3.58E-02	3.58E-02
6	AR	Pike	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	5.83E-02	5.83E-02
6	AR	Polk	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	6.98E-02	6.98E-02
6	AR	Pope	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	2.41E-01	2.41E-01
6	AR	Prairie	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	8.17E-03	8.17E-03
6	AR	Pulaski	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	3	9.92E-01	8.66E-01	1.86E+00
6	AR	Saline	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	7.09E-02	7.09E-02
6	AR	Scott	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	8.33E-01	5.28E-02	8.86E-01
6	AR	Searcy	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.18E-02	1.18E-02
6	AR	Sebastian	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	7.58E-01	7.58E-01
6	AR	Sevier	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	7.30E-02	7.30E-02
6	AR	Union	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	2	5.55E-01	3.42E-01	8.97E-01
6	AR	Van Buren	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	2.43E-02	2.43E-02
6	AR	White	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	5.60E-02	1.48E-01	2.04E-01
6	AR	Woodruff	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	3.30E-02	3.30E-02
6	AR	Yell	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	9.45E-02	9.45E-02
6	LA	Avoyelles Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	2.60E-02	2.60E-02
6	LA	Bienville Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	1.90E-01	2.09E-01	3.99E-01
6	LA	Bossier Parish	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	8.35E-02	8.35E-02
6	LA	Caddo Parish	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	5.12E-01	5.12E-01
6	LA	Caldwell Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	6.81E-03	6.81E-03
6	LA	Catahoula Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.32E-02	1.32E-02
6	LA	Claiborne Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	2.08E-02	2.08E-02
6	LA	Concordia Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.46E-02	1.46E-02

6	LA	East Carroll Parish	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	2.44E-03	2.44E-03
6	LA	Franklin Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	2.29E-02	2.29E-02
6	LA	Grant Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	2.49E-01	2.07E-02	2.69E-01
6	LA	Jackson Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	2.34E+00	3.77E-02	2.38E+00
6	LA	La Salle Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	1.38E-01	3.90E-02	1.77E-01
6	LA	Lincoln Parish	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	2	1.56E-01	6.56E-02	2.22E-01
6	LA	Madison Parish	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	7.06E-03	7.06E-03
6	LA	Morehouse Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	2	2.82E+00	5.48E-02	2.88E+00
6	LA	Ouachita Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	2	1.59E+00	2.89E-01	1.88E+00
6	LA	Rapides Parish	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	1.84E+00	1.33E-01	1.97E+00
6	LA	Red River Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.59E-01	1.59E-01
6	LA	Richland Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.88E-02	1.88E-02
6	LA	Tensas Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	3.08E-03	3.08E-03
6	LA	Union Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	6.58E-02	6.58E-02
6	LA	Webster Parish	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	4.66E-01	7.29E-01	1.19E+00
6	LA	West Carroll Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	6.72E-03	6.72E-03
6	LA	Winn Parish	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	1.43E-01	4.03E-01	5.46E-01
4	MS	Adams	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	1.55E+00	7.63E-02	1.63E+00
4	MS	Bolivar	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	9.64E-02	9.64E-02
4	MS	Claiborne	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	3.89E-02	3.89E-02
4	MS	Coahoma	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	5.29E-02	5.29E-02
4	MS	Humphreys	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	3.81E-02	3.81E-02
4	MS	Issaquena	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	6.03E-04	6.03E-04
4	MS	Leflore	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	9.29E-02	9.29E-02
4	MS	Jefferson	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	7.09E-03	7.09E-03
4	MS	Quitman	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.04E-02	1.04E-02
4	MS	Sharkey	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	5.58E-03	5.58E-03
4	MS	Sunflower	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	9.18E-02	9.18E-02
4	MS	Tallahatchie	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.28E-02	1.28E-02
4	MS	Warren	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	1.96E+00	1.36E-01	2.10E+00
4	MS	Washington	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.62E-01	1.62E-01
4	MS	Yazoo	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	5.24E-02	5.24E-02
6	TX	Bowie	Urban	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	4.02E-01	4.02E-01
6	TX	Cass	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	1	2.04E-01	6.39E-02	2.68E-01
6	TX	Marion	Rural	0102 - Industrial Combustion Coord Rule: Industrial Boilers	0	0.00E+00	1.25E-02	1.25E-02
6	AR	Arkansas	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	9.03E-02	9.03E-02
6	AR	Ashley	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	7.36E-02	7.36E-02
6	AR	Bradley	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.69E-02	3.69E-02
6	AR	Calhoun	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	8.56E-03	8.56E-03
6	AR	Chicot	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	4.38E-02	4.38E-02
6	AR	Clark	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.02E-01	1.02E-01
6	AR	Cleburne	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	7.83E-02	7.83E-02
6	AR	Cleveland	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.01E-02	1.01E-02
6	AR	Columbia	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.03E-01	1.03E-01
6	AR	Conway	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.12E-01	1.12E-01
6	AR	Dallas	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.77E-02	3.77E-02
6	AR	Desha	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	6.91E-02	6.91E-02
6	AR	Drew	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	7.59E-02	7.59E-02
6	AR	Faulkner	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.20E-01	3.20E-01
6	AR	Franklin	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.83E-02	3.83E-02
6	AR	Garland	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	5.15E-01	5.15E-01
6	AR	Grant	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.37E-02	2.37E-02
6	AR	Hempstead	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	7.97E-02	7.97E-02
6	AR	Hot Spring	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	7.31E-02	7.31E-02
6	AR	Howard	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	4.95E-02	4.95E-02
6	AR	Jefferson	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	4.32E-01	4.32E-01
6	AR	Johnson	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	6.21E-02	6.21E-02
6	AR	Lafayette	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.48E-02	1.48E-02
6	AR	Lee	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.08E-02	2.08E-02
6	AR	Lincoln	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.69E-02	1.69E-02
6	AR	Little River	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.08E-02	3.08E-02
6	AR	Logan	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	6.06E-02	6.06E-02

6	AR	Lonoke	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.15E-01	1.15E-01
6	AR	Miller	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.52E-01	1.52E-01
6	AR	Monroe	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.58E-02	3.58E-02
6	AR	Montgomery	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.36E-02	1.36E-02
6	AR	Nevada	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.23E-02	2.23E-02
6	AR	Newton	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.06E-02	1.06E-02
6	AR	Ouachita	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.16E-01	1.16E-01
6	AR	Perry	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.03E-02	1.03E-02
6	AR	Phillips	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	9.59E-02	9.59E-02
6	AR	Pike	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.04E-02	3.04E-02
6	AR	Polk	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	6.22E-02	6.22E-02
6	AR	Pope	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.66E-01	2.66E-01
6	AR	Prairie	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.98E-02	1.98E-02
6	AR	Pulaski	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.92E+00	3.92E+00
6	AR	Saline	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.41E-01	2.41E-01
6	AR	Scott	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.24E-02	2.24E-02
6	AR	Searcy	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.00E-02	2.00E-02
6	AR	Sebastian	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	9.01E-01	9.01E-01
6	AR	Sevier	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	5.24E-02	5.24E-02
6	AR	Union	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.10E-01	2.10E-01
6	AR	Van Buren	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.87E-02	3.87E-02
6	AR	White	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.43E-01	2.43E-01
6	AR	Woodruff	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.33E-02	2.33E-02
6	AR	Yell	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	4.95E-02	4.95E-02
6	LA	Avoyelles Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.40E-01	1.40E-01
6	LA	Bienville Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.25E-02	3.25E-02
6	LA	Bossier Parish	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	4.29E-01	4.29E-01
6	LA	Caddo Parish	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.71E+00	1.71E+00
6	LA	Caldwell Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.54E-02	3.54E-02
6	LA	Catahoula Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.31E-02	2.31E-02
6	LA	Claiborne Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.64E-02	3.64E-02
6	LA	Concordia Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	5.59E-02	5.59E-02
6	LA	East Carroll Parish	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.84E-02	1.84E-02
6	LA	Franklin Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	6.93E-02	6.93E-02
6	LA	Grant Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.51E-02	1.51E-02
6	LA	Jackson Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.73E-02	3.73E-02
6	LA	La Salle Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.63E-02	3.63E-02
6	LA	Lincoln Parish	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.79E-01	1.79E-01
6	LA	Madison Parish	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	4.08E-02	4.08E-02
6	LA	Morehouse Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	9.63E-02	9.63E-02
6	LA	Ouachita Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	9.04E-01	9.04E-01
6	LA	Rapides Parish	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	7.43E-01	7.43E-01
6	LA	Red River Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.21E-02	2.21E-02
6	LA	Richland Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	7.55E-02	7.55E-02
6	LA	Tensas Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.18E-02	1.18E-02
6	LA	Union Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.63E-02	3.63E-02
6	LA	Webster Parish	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	1	0.00E+00	1.37E-01	1.37E-01
6	LA	West Carroll Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.37E-02	2.37E-02
6	LA	Winn Parish	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	5.27E-02	5.27E-02
4	MS	Adams	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.10E-01	2.10E-01
4	MS	Bolivar	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.64E-01	1.64E-01
4	MS	Claiborne	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.33E-02	2.33E-02
4	MS	Coahoma	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.51E-01	1.51E-01
4	MS	Humphreys	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.88E-02	2.88E-02
4	MS	Issaquena	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.84E-03	1.84E-03
4	MS	Jefferson	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.02E-02	1.02E-02
4	MS	Leflore	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.01E-01	2.01E-01
4	MS	Quitman	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.81E-02	1.81E-02
4	MS	Sharkey	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.68E-02	1.68E-02
4	MS	Sunflower	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.20E-01	1.20E-01
4	MS	Tallahatchie	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	2.56E-02	2.56E-02
4	MS	Warren	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.38E-01	3.38E-01

4	MS	Washington	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	3.38E-01	3.38E-01
4	MS	Yazoo	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	7.80E-02	7.80E-02
6	TX	Bowie	Urban	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	5.11E-01	5.11E-01
6	TX	Cass	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	9.78E-02	9.78E-02
6	TX	Marion	Rural	0103 - Industrial Combustion Coord Rule: Institutional/Commercial Boilers	0	0.00E+00	1.86E-02	1.86E-02
6	AR	Pulaski	Urban	0105 - Industrial Combustion Coord Rule: Stationary Internal Combustion Engines	0	0.00E+00	5.24E-03	5.24E-03
6	AR	Sebastian	Urban	0105 - Industrial Combustion Coord Rule: Stationary Internal Combustion Engines	0	0.00E+00	5.14E-04	5.14E-04
6	AR	Union	Rural	0105 - Industrial Combustion Coord Rule: Stationary Internal Combustion Engines	0	0.00E+00	8.96E-04	8.96E-04
6	AR	White	Rural	0105 - Industrial Combustion Coord Rule: Stationary Internal Combustion Engines	0	0.00E+00	2.42E-02	2.42E-02
6	LA	Bienville Parish	Rural	0105 - Industrial Combustion Coord Rule: Stationary Internal Combustion Engines	0	0.00E+00	3.19E-04	3.19E-04
6	LA	Bossier Parish	Urban	0105 - Industrial Combustion Coord Rule: Stationary Internal Combustion Engines	0	0.00E+00	1.86E-02	1.86E-02
6	LA	Grant Parish	Rural	0105 - Industrial Combustion Coord Rule: Stationary Internal Combustion Engines	0	0.00E+00	8.60E-04	8.60E-04
6	LA	Lincoln Parish	Urban	0105 - Industrial Combustion Coord Rule: Stationary Internal Combustion Engines	0	0.00E+00	8.94E-04	8.94E-04
6	TX	Bowie	Urban	0105 - Industrial Combustion Coord Rule: Stationary Internal Combustion Engines	0	0.00E+00	5.97E-04	5.97E-04
6	AR	Little River	Rural	0410 - Portland Cement Manufacturing	3	4.60E+02	0.00E+00	4.60E+02
6	TX	Cass	Rural	0410 - Portland Cement Manufacturing	2	5.42E-01	0.00E+00	5.42E-01
6	AR	Union	Rural	0502 - Petroleum Refineries - Catalytic Cracking, Catalytic Reforming, & Sulfur Plant Units	2	2.09E+00	0.00E+00	2.09E+00
6	AR	Jefferson	Urban	0801 - Hazardous Waste Incineration	0	0.00E+00	6.00E+01	6.00E+01
6	AR	Union	Rural	0801 - Hazardous Waste Incineration	1	0.00E+00	1.40E+02	1.40E+02
6	AR	White	Rural	0801 - Hazardous Waste Incineration	1	8.42E-01	0.00E+00	8.42E-01
6	AR	Arkansas	Urban	0802 - Municipal Landfills	0	0.00E+00	7.30E-04	7.30E-04
6	AR	Ashley	Rural	0802 - Municipal Landfills	0	0.00E+00	1.92E-02	1.92E-02
6	AR	Calhoun	Rural	0802 - Municipal Landfills	0	0.00E+00	2.38E-02	2.38E-02
6	AR	Chicot	Urban	0802 - Municipal Landfills	0	0.00E+00	1.41E-03	1.41E-03
6	AR	Columbia	Rural	0802 - Municipal Landfills	0	0.00E+00	1.43E-03	1.43E-03
6	AR	Conway	Rural	0802 - Municipal Landfills	0	0.00E+00	6.10E-03	6.10E-03
6	AR	Desha	Urban	0802 - Municipal Landfills	0	0.00E+00	1.12E-03	1.12E-03
6	AR	Faulkner	Urban	0802 - Municipal Landfills	0	0.00E+00	1.52E-02	1.52E-02
6	AR	Garland	Rural	0802 - Municipal Landfills	0	0.00E+00	6.69E-04	6.69E-04
6	AR	Hempstead	Rural	0802 - Municipal Landfills	0	0.00E+00	2.46E-03	2.46E-03
6	AR	Howard	Rural	0802 - Municipal Landfills	0	0.00E+00	2.83E-02	2.83E-02
6	AR	Jefferson	Urban	0802 - Municipal Landfills	0	0.00E+00	8.05E-02	8.05E-02
6	AR	Lafayette	Rural	0802 - Municipal Landfills	0	0.00E+00	4.20E-03	4.20E-03
6	AR	Lee	Rural	0802 - Municipal Landfills	0	0.00E+00	2.36E-03	2.36E-03
6	AR	Little River	Rural	0802 - Municipal Landfills	0	0.00E+00	1.22E-03	1.22E-03
6	AR	Logan	Rural	0802 - Municipal Landfills	0	0.00E+00	1.67E-03	1.67E-03
6	AR	Nevada	Rural	0802 - Municipal Landfills	0	0.00E+00	1.01E-03	1.01E-03
6	AR	Ouachita	Rural	0802 - Municipal Landfills	0	0.00E+00	2.09E-02	2.09E-02
6	AR	Phillips	Urban	0802 - Municipal Landfills	0	0.00E+00	1.53E-03	1.53E-03
6	AR	Pike	Rural	0802 - Municipal Landfills	0	0.00E+00	1.14E-03	1.14E-03
6	AR	Polk	Rural	0802 - Municipal Landfills	0	0.00E+00	1.32E-03	1.32E-03
6	AR	Pope	Urban	0802 - Municipal Landfills	0	0.00E+00	6.84E-03	6.84E-03
6	AR	Prairie	Rural	0802 - Municipal Landfills	0	0.00E+00	3.36E-02	3.36E-02
6	AR	Pulaski	Urban	0802 - Municipal Landfills	0	0.00E+00	3.37E-02	3.37E-02
6	AR	Saline	Urban	0802 - Municipal Landfills	0	0.00E+00	5.29E-02	5.29E-02
6	AR	Scott	Rural	0802 - Municipal Landfills	0	0.00E+00	1.79E-03	1.79E-03
6	AR	Sebastian	Urban	0802 - Municipal Landfills	0	0.00E+00	1.36E-02	1.36E-02
6	AR	Sevier	Rural	0802 - Municipal Landfills	0	0.00E+00	1.61E-03	1.61E-03
6	AR	Union	Rural	0802 - Municipal Landfills	0	0.00E+00	1.76E-02	1.76E-02
6	AR	Van Buren	Rural	0802 - Municipal Landfills	0	0.00E+00	5.42E-03	5.42E-03
6	AR	White	Rural	0802 - Municipal Landfills	0	0.00E+00	5.14E-03	5.14E-03
6	AR	Yell	Rural	0802 - Municipal Landfills	0	0.00E+00	6.26E-03	6.26E-03
6	LA	Avoyelles Parish	Rural	0802 - Municipal Landfills	0	0.00E+00	2.18E-02	2.18E-02
6	LA	Bossier Parish	Urban	0802 - Municipal Landfills	0	0.00E+00	2.82E-02	2.82E-02
6	LA	Caddo Parish	Urban	0802 - Municipal Landfills	0	0.00E+00	4.46E-02	4.46E-02
6	LA	Caldwell Parish	Rural	0802 - Municipal Landfills	0	0.00E+00	5.99E-03	5.99E-03
6	LA	Claiborne Parish	Rural	0802 - Municipal Landfills	0	0.00E+00	2.18E-02	2.18E-02
6	LA	La Salle Parish	Rural	0802 - Municipal Landfills	0	0.00E+00	1.91E-02	1.91E-02
6	LA	Lincoln Parish	Urban	0802 - Municipal Landfills	0	0.00E+00	8.02E-04	8.02E-04
6	LA	Rapides Parish	Urban	0802 - Municipal Landfills	0	0.00E+00	6.79E-02	6.79E-02
6	LA	Tensas Parish	Rural	0802 - Municipal Landfills	0	0.00E+00	1.41E-03	1.41E-03
6	LA	Union Parish	Rural	0802 - Municipal Landfills	0	0.00E+00	1.21E-02	1.21E-02

6	LA	Webster Parish	Urban	0802 - Municipal Landfills	0	0.00E+00	1.27E-02	1.27E-02
6	LA	West Carroll Parish	Rural	0802 - Municipal Landfills	0	0.00E+00	4.05E-03	4.05E-03
4	MS	Adams	Urban	0802 - Municipal Landfills	0	0.00E+00	1.66E-02	1.66E-02
4	MS	Bolivar	Rural	0802 - Municipal Landfills	0	0.00E+00	4.24E-03	4.24E-03
4	MS	Humphreys	Rural	0802 - Municipal Landfills	0	0.00E+00	1.41E-03	1.41E-03
4	MS	Issaquena	Rural	0802 - Municipal Landfills	0	0.00E+00	2.86E-02	2.86E-02
4	MS	Leflore	Rural	0802 - Municipal Landfills	0	0.00E+00	2.81E-02	2.81E-02
4	MS	Quitman	Rural	0802 - Municipal Landfills	0	0.00E+00	2.18E-02	2.18E-02
4	MS	Sharkey	Rural	0802 - Municipal Landfills	0	0.00E+00	1.19E-03	1.19E-03
4	MS	Sunflower	Rural	0802 - Municipal Landfills	0	0.00E+00	7.79E-03	7.79E-03
4	MS	Warren	Urban	0802 - Municipal Landfills	0	0.00E+00	1.18E-02	1.18E-02
4	MS	Washington	Urban	0802 - Municipal Landfills	0	0.00E+00	3.99E-02	3.99E-02
6	TX	Bowie	Urban	0802 - Municipal Landfills	0	0.00E+00	1.81E-02	1.81E-02
6	TX	Cass	Rural	0802 - Municipal Landfills	0	0.00E+00	1.18E-04	1.18E-04
6	AR	Ashley	Rural	1626 - Pulp & Paper Production	1	3.81E+01	0.00E+00	3.81E+01
6	AR	Conway	Rural	1626 - Pulp & Paper Production	1	1.37E+01	0.00E+00	1.37E+01
6	AR	Desha	Urban	1626 - Pulp & Paper Production	1	1.46E+01	0.00E+00	1.46E+01
6	AR	Jefferson	Urban	1626 - Pulp & Paper Production	2	3.56E+01	0.00E+00	3.56E+01
6	AR	Little River	Rural	1626 - Pulp & Paper Production	1	6.27E+01	0.00E+00	6.27E+01
6	AR	Ouachita	Rural	1626 - Pulp & Paper Production	1	2.17E+01	0.00E+00	2.17E+01
6	LA	Jackson Parish	Rural	1626 - Pulp & Paper Production	1	4.48E+01	0.00E+00	4.48E+01
6	LA	Morehouse Parish	Rural	1626 - Pulp & Paper Production	1	4.17E+01	0.00E+00	4.17E+01
6	LA	Ouachita Parish	Rural	1626 - Pulp & Paper Production	1	3.85E+01	0.00E+00	3.85E+01
6	LA	Rapides Parish	Urban	1626 - Pulp & Paper Production	1	2.32E+01	0.00E+00	2.32E+01
4	MS	Adams	Urban	1626 - Pulp & Paper Production	1	5.53E+01	0.00E+00	5.53E+01
4	MS	Warren	Urban	1626 - Pulp & Paper Production	1	2.29E+01	0.00E+00	2.29E+01
6	TX	Bowie	Urban	1626 - Pulp & Paper Production	1	4.93E+01	0.00E+00	4.93E+01
6	AR	Jefferson	Urban	1803 - Utility Boilers: Coal	1	5.65E+02	0.00E+00	5.65E+02
6	LA	Rapides Parish	Urban	1803 - Utility Boilers: Coal	1	3.07E+02	0.00E+00	3.07E+02
6	AR	Jefferson	Urban	1805 - Utility Boilers: Oil	1	4.93E-01	0.00E+00	4.93E-01
6	AR	Ouachita	Rural	1805 - Utility Boilers: Oil	1	3.60E-03	0.00E+00	3.60E-03
6	LA	Ouachita Parish	Rural	1805 - Utility Boilers: Oil	1	6.67E-03	0.00E+00	6.67E-03
6	LA	Rapides Parish	Urban	1805 - Utility Boilers: Oil	1	2.39E-02	0.00E+00	2.39E-02
4	MS	Washington	Urban	1805 - Utility Boilers: Oil	1	3.40E-02	0.00E+00	3.40E-02
6	AR	Arkansas	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.28E-01	1.28E-01
6	AR	Ashley	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.49E-01	1.49E-01
6	AR	Bradley	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	7.07E-02	7.07E-02
6	AR	Calhoun	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	3.47E-02	3.47E-02
6	AR	Chicot	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	9.21E-02	9.21E-02
6	AR	Clark	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.34E-01	1.34E-01
6	AR	Cleburne	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.36E-01	1.36E-01
6	AR	Cleveland	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.04E-02	5.04E-02
6	AR	Columbia	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.54E-01	1.54E-01
6	AR	Conway	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.20E-01	1.20E-01
6	AR	Dallas	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.65E-02	5.65E-02
6	AR	Desha	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	9.40E-02	9.40E-02
6	AR	Drew	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.08E-01	1.08E-01
6	AR	Faulkner	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	4.51E-01	4.51E-01
6	AR	Franklin	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	9.98E-02	9.98E-02
6	AR	Garland	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	4.99E-01	4.99E-01
6	AR	Grant	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	9.38E-02	9.38E-02
6	AR	Hempstead	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.34E-01	1.34E-01
6	AR	Hot Spring	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.73E-01	1.73E-01
6	AR	Howard	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	8.49E-02	8.49E-02
6	AR	Jefferson	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.05E-01	5.05E-01
6	AR	Johnson	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.27E-01	1.27E-01
6	AR	Lafayette	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.61E-02	5.61E-02
6	AR	Lee	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	7.71E-02	7.71E-02
6	AR	Lincoln	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	8.66E-02	8.66E-02
6	AR	Little River	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	8.10E-02	8.10E-02
6	AR	Logan	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.29E-01	1.29E-01
6	AR	Lonoke	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.89E-01	2.89E-01

6	AR	Miller	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.40E-01	2.40E-01
6	AR	Monroe	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	6.33E-02	6.33E-02
6	AR	Montgomery	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.12E-02	5.12E-02
6	AR	Nevada	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	6.10E-02	6.10E-02
6	AR	Newton	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	4.84E-02	4.84E-02
6	AR	Ouachita	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.72E-01	1.72E-01
6	AR	Perry	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.64E-02	5.64E-02
6	AR	Phillips	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.69E-01	1.69E-01
6	AR	Pike	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	6.36E-02	6.36E-02
6	AR	Polk	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.18E-01	1.18E-01
6	AR	Pope	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	3.11E-01	3.11E-01
6	AR	Prairie	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.65E-02	5.65E-02
6	AR	Pulaski	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.14E+00	2.14E+00
6	AR	Saline	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	4.52E-01	4.52E-01
6	AR	Scott	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	6.53E-02	6.53E-02
6	AR	Searcy	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	4.68E-02	4.68E-02
6	AR	Sebastian	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	6.42E-01	6.42E-01
6	AR	Sevier	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	8.99E-02	8.99E-02
6	AR	Union	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.79E-01	2.79E-01
6	AR	Van Buren	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	9.29E-02	9.29E-02
6	AR	White	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	3.79E-01	3.79E-01
6	AR	Woodruff	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.56E-02	5.56E-02
6	AR	Yell	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.15E-01	1.15E-01
6	LA	Avoyelles Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.47E-01	2.47E-01
6	LA	Bienville Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	9.68E-02	9.68E-02
6	LA	Bossier Parish	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.59E-01	5.59E-01
6	LA	Caddo Parish	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.49E+00	1.49E+00
6	LA	Caldwell Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	6.21E-02	6.21E-02
6	LA	Catahoula Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	6.76E-02	6.76E-02
6	LA	Claiborne Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.04E-01	1.04E-01
6	LA	Concordia Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.27E-01	1.27E-01
6	LA	East Carroll Parish	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.55E-02	5.55E-02
6	LA	Franklin Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.35E-01	1.35E-01
6	LA	Grant Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.13E-01	1.13E-01
6	LA	Jackson Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	9.48E-02	9.48E-02
6	LA	La Salle Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	8.41E-02	8.41E-02
6	LA	Lincoln Parish	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.56E-01	2.56E-01
6	LA	Madison Parish	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	7.96E-02	7.96E-02
6	LA	Morehouse Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.94E-01	1.94E-01
6	LA	Ouachita Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	8.94E-01	8.94E-01
6	LA	Rapides Parish	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	7.67E-01	7.67E-01
6	LA	Red River Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.91E-02	5.91E-02
6	LA	Richland Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.27E-01	1.27E-01
6	LA	Tensas Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	4.16E-02	4.16E-02
6	LA	Union Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.31E-01	1.31E-01
6	LA	Webster Parish	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.59E-01	2.59E-01
6	LA	West Carroll Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	7.43E-02	7.43E-02
6	LA	Winn Parish	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.09E-01	1.09E-01
4	MS	Adams	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.10E-01	2.10E-01
4	MS	Bolivar	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.49E-01	2.49E-01
4	MS	Claiborne	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	7.10E-02	7.10E-02
4	MS	Coahoma	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.92E-01	1.92E-01
4	MS	Humphreys	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	6.95E-02	6.95E-02
4	MS	Issaquena	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.00E-02	1.00E-02
4	MS	Leflore	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.27E-01	2.27E-01
4	MS	Quitman	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	6.01E-02	6.01E-02
4	MS	Jefferson	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.15E-02	5.15E-02
4	MS	Sharkey	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	4.14E-02	4.14E-02
4	MS	Sunflower	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.15E-01	2.15E-01
4	MS	Tallahatchie	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	9.14E-02	9.14E-02
4	MS	Warren	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	2.98E-01	2.98E-01
4	MS	Washington	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	4.02E-01	4.02E-01

4	MS	Yazoo	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.53E-01	1.53E-01
6	TX	Bowie	Urban	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	5.12E-01	5.12E-01
6	TX	Cass	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	1.86E-01	1.86E-01
6	TX	Marion	Rural	1807 - Industrial Combustion Coord Rule: Industrial, Commercial & Other Waste Incineration	0	0.00E+00	6.38E-02	6.38E-02

APPENDIX C

Ouachita River Basin Precipitation

1997 - 1999 monthly total precip data in Ouachita River basin (inches)

STATION	Station #	HUC	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	
CALION LOCK & DAM	1140	8040201	1997	6.00	6.37	9.20	13.12	5.59	2.59	1.34	3.19	0.93	4.18	4.57	4.63	61.71	
CALION LOCK & DAM	1140	8040201	1998	7.18	3.74	4.49	2.38	0.75	1.68	2.52	5.06	5.21	2.19	3.59	7.04	45.83	
CALION LOCK & DAM	1140	8040201	1999	9.23	0.79	3.95	6.05	3.42	7.04	1.70	2.25	0.89	2.55	0.45	2.45	40.77	
FORDYCE	2540	8040201	1997	5.54	5.73	8.24	11.13	5.80	6.04	1.49	3.21	1.28	4.12	3.77	4.84	61.19	
FORDYCE	2540	8040201	1998	8.80	5.21	5.52	3.28	1.35	2.43	4.13	1.97	7.25	7.60	2.48	6.58	56.60	
FORDYCE	2540	8040201	1999	8.23	1.11	7.61	5.32	4.88	5.70	1.16	2.06	0.74	2.08	3.10	3.68	45.67	
HAMPTON 5 SE	3101	8040201	1999	10.26	1.40	5.48	6.38	5.36	7.80	3.52	1.43	1.39	1.90	1.19	3.65	49.76	
			AVERAGE	7.89	3.48	6.36	6.81	3.88	4.75	2.27	2.74	2.53	3.52	2.74	4.70	51.65	1.31 m
CROSSETT 2 SSE	1730	8040202	1997	7.17	7.46	8.15	8.21	8.34	4.93	1.48	2.18	3.13	4.59	3.24	4.66	63.54	
CROSSETT 2 SSE	1730	8040202	1998	8.19	5.23	5.52	2.90	0.14	0.62	3.51	1.36	4.56	0.26	5.23	6.99	44.51	
CROSSETT 2 SSE	1730	8040202	1999	15.72	1.75	3.73	3.76	5.53	4.88	1.42	2.23	1.94	0.91	1.76	2.51	46.14	
STERLINGTON	8785	8040202	1997	9.14	6.77	6.00	7.78	5.17	3.87	2.70	3.01	2.73	6.07	4.01	6.60	63.85	
STERLINGTON	8785	8040202	1998	10.53	3.82	5.72	3.60	0.00	1.33	2.30	4.08	7.31	0.10	4.65	8.06	51.50	
STERLINGTON	8785	8040202	1999	15.77	0.83	5.99	5.81	1.67	6.97	2.58	0.00	3.53	1.24	0.72	3.97	49.08	
FELSENTHAL	2475	8040202	1998	---	---	---	---	---	0.1	8.81	4.23	6.01	2.02	4.72	7.71	33.6	
FELSENTHAL	2475	8040202	1999	17.36	0.73	3.96	3.88	4.06	10.09	2.54	3.6	0.6	1.42	1.34	4.21	53.79	
			AVERAGE	11.98	3.80	5.58	5.13	3.56	4.10	3.17	2.59	3.73	2.08	3.21	5.59	50.75	1.29 m
ALUM FORK	130	8040203	1997	2.99	6.43	7.40	9.38	5.18	5.76	2.38	1.81	3.80	7.58	3.89	4.54	61.14	
ALUM FORK	130	8040203	1998	6.06	7.47	6.96	3.14	3.59	1.48	3.96	6.46	5.14	9.44	2.27	4.20	60.17	
ALUM FORK	130	8040203	1999	8.21	1.55	6.08	6.74	6.44	3.02	3.18	2.02	2.17	4.50	2.75	4.16	50.82	
BENTON	582	8040203	1997	2.40	4.56	6.43	8.13	3.31	5.60	1.00	2.15	4.54	6.16	4.05	3.47	51.80	
BENTON	582	8040203	1998	5.19	5.35	5.95	1.55	2.61	1.20	5.08	3.50	5.02	5.08	2.68	3.05	46.26	
BENTON	582	8040203	1999	8.35	1.25	5.41	6.88	3.35	4.05	2.52	1.48	2.02	2.53	4.16	4.75	46.75	
SHERIDAN	6562	8040203	1997	4.32	5.11	6.04	15.15	2.30	8.36	1.23	1.77	1.91	5.21	4.97	4.33	60.70	
SHERIDAN	6562	8040203	1998	6.27	3.23	4.96	1.32	1.52	1.19	3.84	2.68	5.50	4.26	2.64	7.03	44.44	
SHERIDAN	6562	8040203	1999	6.07	1.58	9.81	6.32	4.17	4.40	0.56	0.62	1.64	1.64	3.82	4.16	44.79	
			AVERAGE	5.54	4.06	6.56	6.51	3.61	3.90	2.64	2.50	3.53	5.16	3.47	4.41	51.87	1.32 m
MONTICELLO 3 SW	4900	8040204	1997	4.13	5.70	6.37	10.75	6.36	6.71	1.85	0.74	1.98	3.56	2.93	4.25	55.33	
MONTICELLO 3 SW	4900	8040204	1998	6.90	3.68	3.28	3.43	1.57	1.52	3.95	1.29	4.82	1.26	3.43	7.28	42.41	
MONTICELLO 3 SW	4900	8040204	1999	15.21	1.34	5.79	5.59	3.87	4.70	0.97	1.52	1.93	1.53	3.42	4.85	50.72	
WARREN 2 WSW	7582	8040204	1997	6.17	6.40	9.47	12.96	4.96	10.46	1.23	2.92	2.19	4.29	4.25	4.23	69.53	
WARREN 2 WSW	7582	8040204	1998	6.99	4.08	5.32	3.28	0.64	1.44	2.64	2.30	6.05	1.62	2.63	7.39	44.38	
WARREN 2 WSW	7582	8040204	1999	13.16	1.09	6.28	5.66	4.85	6.21	1.21	0.67	2.13	2.53	2.53	3.38	49.70	
			AVERAGE	8.76	3.72	6.09	6.95	3.71	5.17	1.98	1.57	3.18	2.47	3.20	5.23	52.01	1.32 m
HAMBURG	3088	8040205	1997	5.72	7.10	5.10	5.11	3.86	5.53	2.15	3.14	4.55	4.13	1.52	5.17	53.08	
HAMBURG	3088	8040205	1998	6.20	4.48	---	3.45	0.12	---	2.59	1.38	2.42	0.10	4.63	6.25	31.62	
HAMBURG	3088	8040205	1999	8.24	1.17	---	3.29	---	9.47	0.00	1.55	0.61	2.41	---	---	26.74	
PINE BLUFF	5754	8040205	1997	3.47	7.29	5.17	11.46	2.00	5.20	0.61	2.89	2.33	3.89	4.80	4.24	53.35	
PINE BLUFF	5754	8040205	1998	7.63	3.02	5.19	1.93	0.77	2.63	4.18	2.79	3.65	4.04	3.02	7.32	46.17	
PINE BLUFF	5754	8040205	1999	6.84	1.01	6.70	4.48	4.25	2.63	2.33	0.05	1.26	3.17	2.89	4.51	40.12	
BASTROP	537	8040205	1997	8.83	8.67	5.59	8.28	5.83	3.56	2.98	2.78	1.89	5.81	4.24	6.22	64.68	
BASTROP	537	8040205	1998	11.33	---	4.96	4.47	0.64	1.87	6.02	2.94	6.46	0.84	4.55	8.19	52.27	
BASTROP	537	8040205	1999	14.88	0.98	7.09	6.55	---	7.00	1.16	0.68	5.13	1.24	1.09	4.14	49.94	
			AVERAGE	8.13	4.22	5.69	5.45	2.50	4.74	2.45	2.02	3.14	2.85	3.34	5.76	46.44	1.18 m
CALHOUN RESEARCH STN	1411	8040207	1997	7.92	9.43	6.21	8.69	7.16	2.72	2.86	2.65	1.16	5.89	4.60	6.69	65.98	
CALHOUN RESEARCH STN	1411	8040207	1998	10.57	6.77	6.16	3.63	0.89	1.69	1.50	3.55	7.93	1.00	5.75	7.94	57.38	
CALHOUN RESEARCH STN	1411	8040207	1999	16.68	0.61	6.26	5.04	2.04	5.26	1.72	0.54	2.73	2.74	0.69	3.95	48.26	
COLUMBIA LOCKS	1979	8040207	1997	3.15	9.75	4.68	8.86	8.10	5.25	3.25	2.70	6.15	7.15	4.28	7.98	71.30	
COLUMBIA LOCKS	1979	8040207	1998	11.69	9.94	5.70	3.59	0.61	1.88	2.99	3.61	7.22	1.97	5.98	10.23	65.41	

1997 - 1999 monthly total precip data in Ouachita River basin (inches)

STATION	Station #	HUC	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	
COLUMBIA LOCKS	1979	8040207	1999	13.02	1.47	7.47	7.07	2.25	12.14	3.08	0.00	4.29	2.63	0.84	4.52	58.78	
MONROE NLU	6314	8040207	1997	9.52	9.37	5.90	7.41	6.07	4.59	3.55	3.53	2.40	5.20	5.10	6.57	69.21	
MONROE NLU	6314	8040207	1998	10.85	6.89	4.96	4.26	0.54	1.14	1.94	3.07	6.96	1.51	5.96	7.66	55.74	
MONROE NLU	6314	8040207	1999	17.26	1.19	6.78	6.65	3.18	10.39	4.94	0.98	2.29	1.88	0.84	4.49	60.87	
STERLINGTON # 2	8788	8040207	1997	9.16	7.31	5.95	7.78	6.25	2.76	2.11	3.54	2.06	6.42	4.10	6.16	63.60	
STERLINGTON # 2	8788	8040207	1998	10.37	6.51	4.81	3.89	0.31	1.59	3.01	5.07	7.19	1.15	5.06	7.95	56.91	
STERLINGTON # 2	8788	8040207	1999	14.09	0.80	7.24	6.06	3.32	8.94	1.82	1.94	4.86	1.38	0.79	3.94	55.18	
			AVERAGE	11.19	5.84	6.01	6.08	3.39	4.86	2.73	2.60	4.60	3.24	3.67	6.51	60.72	1.54 m
OUACHITA RIVER BASIN AVERAGE				8.78	4.50	6.12	6.16	3.38	4.48	2.43	2.33	3.62	3.37	3.38	5.47	52.81	1.33 m

APPENDIX D

LDEQ Comments Regarding Mercury TMDLs

April 29, 2002

Ms. Ellen Caldwell, Environmental Protection Specialist
Water Quality Protection Division
United States Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

RE: Comments on Federal Register: March 29, 2002 (Volume 67, Number 61) [FRL-7165-6], Clean Water Act Section 303(d): Availability of Total Maximum Daily Loads (TMDLs) and Determinations that TMDLs are not needed for 20 waterbody/pollutant combinations in the Calcasieu and Ouachita river basins.

Dear Ms. Caldwell:

The Louisiana Department of Environmental Quality hereby submits comments on the 98 TMDLs and the calculations for these TMDLs prepared by EPA Region 6 for waters listed in the Calcasieu and Ouachita river basins, under section 303(d) of the Clean Water Act. Listed below are general comments. Refer to the Attachments for specific comments and discussion.

1. It is inappropriate to use non-regulatory "targets" (sediment guidelines or others) as end-points for TMDLs.

2. Incorrect flows were applied in some areas (e.g. harmonic mean was used rather than tidal flows).

3. EPA's use of non-clean technique metals data is inappropriate. Metals data from the Superfund project should not have been used at all since clean sampling and analysis techniques were not used. When EPA did use these data, they were often not applied correctly. For example, Louisiana instream criteria are based on dissolved metals; yet EPA used both dissolved and total metals data to compare to the dissolved criteria. EPA’s use of applying total metals to dissolved metals criteria in order to determine exceedences is flawed.

4. LDEQ Ambient Network data should not have been used to justify TMDLs for the same reason as the Superfund data. The available LDEQ data were not collected and analyzed using clean techniques. LDEQ uses

these data as a screening tool to target more intensive sampling and analysis using clean techniques, not for justifying and developing TMDLs.

5. It is inappropriate to assume industries discharge a pollutant when it has not been included in their permit. EPA knows that when effluent limits are determined for each facility based on a number of factors, including the type of facility, types of waste-streams and effluent data submitted during the application process.

6. Monitoring schedules and locations for the different pollutants have been recommended for Louisiana throughout the document; Louisiana will continue its ambient and intensive monitoring programs according to established schedules and agreements.

7. LDEQ's comments concerning specific TMDLs will indicate that EPA has made numerous errors in listing dischargers in the TMDL.

8. The use of sediment data to assess for water quality use impairment and need for TMDLs has no precedent. Neither LDEQ nor EPA has promulgated sediment criteria. Therefore, the use of non- regulatory sediment guidelines and screening values, as Region 6 has done in this report, is not appropriate in assessing for water quality impairment or determining the need for TMDLs.

9. Many of these TMDLs are based on models using historical water quality data gathered at a single or small number of locations rather than survey data gathered at sites spaced throughout the waterbody. The hydraulic information used was generally an average value or estimated value, not taken at the same time as the water quality data. The calibrations are inadequate due to the lack of appropriate hydrologic data and the paucity of water quality data. The resulting TMDLs are invalid. LDEQ does not accept these TMDLs.

We look forward to hearing your response to these comments.

Sincerely,

Emelise S. Cormier
Environmental Scientist Senior
Technology Division

Enclosure(s)

c: Willie Lane
EPA
Region 6

LDEQ COMMENTS ON THE DRAFT TMDLS PUBLISHED BY EPA

LDEQ has reviewed the TMDLs published by EPA on March 29, 2002. One particularly troubling issue for LDEQ is the fact that numerous dischargers that should have been included in these TMDLs were not. This indicates a complete disregard for the discharger inventory LDEQ provided to EPA. At the least, the TMDLs should acknowledge all facilities present in the covered watershed(s) and present the decisions for including or not including them in the TMDL.

In the future, LDEQ requests that EPA provide hard copies of the TMDLs and Appendices for LDEQ review. Hard copies will insure that the complete official document is being reviewed and will eliminate the time required for LDEQ to put together the document from electronic files.

In general, LDEQ found these TMDLs to be unacceptable.

Federal Register Notice: Volume 67, Number 61, pages 15196 - 15198 (3/29/2002)

MERCURY

Ouachita River Mercury (Subsegment 080101)
Coastal Waters of Calcasieu River Basin TMDL for Mercury (Subsegment 031201)

General Comments on Mercury TMDLs:

1. It was assumed that a linear relationship exists between the mercury load to the subsegment and the king mackerel tissue mercury concentrations. The relationship between mercury load to a waterbody and the accumulation of mercury in the fish tissue is not thoroughly understood. A TMDL based on this relationship is disputable.

Response: EPA agrees that the relationship between concentrations of mercury in a waterbody and the accumulations of mercury in fish tissue can be complex and is not completely understood. However, in the interest of completing mercury TMDLs within court ordered schedules, some simplified assumption regarding this relationship had to be made. Assumption of linear relationship has precedence in previous mercury TMDLs based on fish tissue concentrations. This TMDL can be re-evaluated in the future taking into account a more realistic representation of the relationship between mercury in fish tissue and the environment as this interaction becomes better understood.

2. The calculations for the load allocations should be thoroughly explained. Sample calculations should be provided in the appendices.

Response: Explanations of the methods for calculating the load allocations have been added to the document.

<u>TMDL Stream Specific Comments:</u>
Coastal Waters of Calcasieu River Basin TMDL for Mercury (Subsegment 031201)

1. Section 4.4.2 Local and Global/Regional Atmospheric Deposition Sources; Paragraph 3; Sentences 5-7; Page4-7: The documentation showed that the total mercury emissions for Calcasieu Parish were 1,702 lb. This data was obtained from the National Toxics Inventory (NTI). LDEQ's Toxic Emissions Data Inventory Program stated the emissions for Calcasieu Parish were 1,222 lb. for 1999 and 1,281 for 1996. Mercury emissions from local sources were estimated with the higher NTI values. These values are not consistent with LDEQ's data.

Response: Additional text has been added to this paragraph explaining that the loads reported by TEDI and NIT are different because NTI includes loads from minor sources as well as major sources. NTI data were used because it was judged to be a more comprehensive accounting of mercury loading in the airshed.

2. Section 4.4.5 Current Mercury Load Summary; Page 4-10: Sentence three states that no point source contributions were included in the TMDL. This contradicts statements made in Section 4.4.4, Paragraph 2.

Response: Additional text has been added to this paragraph to clarify that while point source data were used to estimate a mercury load for the Calcasieu River, these point sources were not included in the TMDL load allocation as WLAs since they do not discharge directly to the subsegment. Load allocations for these point sources are expected to be addressed in mercury TMDLs of the Calcasieu River.